CHEMICAL INDUSTRIES

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"The Country Must Choose"

WE ARE indebted to Secretary Wallace, able and most realistic Administration advisor, for the warning that the country must choose between a foreign policy of nationalism or internationalism, and we should like to point out that a more important choice between bureaucracy and individualism in domestic policy is as imperative and to most Americans more important.

The partnership with Government which the President proposed to Business twelve months ago has not kept its glittering promises; but it has been worked out in sufficient detail and for a long enough time to give us a good idea of its practical effects. The year has shown that anything like a true partnership, based upon mutual interests, mutual respect, mutual confidence, is a myth. National prosperity is the only common interest, and the contributions that Government and Business can make to this common cause are so diverse that co-operation must be very limited. The present Government has plainly no respect for Business. Business has no confidence in Government. Business has been accused of holding back, and retaliates that Government has used coercion. The first proposals came from the Administration and when they were not welcomed the President's Reemployment Agreement forced shorter hours and higher wages. More lately the compensating control over prices and trade practices has been virtually abrogated. Industries have been accused without hearing. Contracts have been cancelled with no redress in court. Projects involving vast expenditures have been entered into in direct competition with established industries. Legislation involving the most drastic control of currency, of advertising, of corporate finances, of child labor on one side and executive salaries on the other, is all a part of the Administration's program. Month after month the proposals have become more and more radical and the acts more and more arbitrary.

Here is an issue, Mr. Secretary of Agriculture, quite as clear cut as whether we are to export wheat and cotton or restrict our cash crops and subsidize the farmers.

Competition: Good and Bad Pretty promptly we must clarify our American ideas about competition. What was badly confused by the anti-trust laws and the rulings of the Federal Trade Commission is worse confounded by NRA and its codes. Unfair competition has been illy defined. Who knows where clever selling ends and chiselling begins?

Many American concepts of competition are at variance with the ideas held in other countries and some of them are quite unique. Of the four elements in competition that the legal point-of-view recognizes, the first, good conduct, is universally accepted. To bribe employees to betray trade secrets or injure machinery, to induce customers to break contracts, to damage reputation by false statements, are contrary to public morals; and for reasons that have nothing to do with competition are forbidden in all countries. However, when we come to the other three,—good results, good motives, and good relations—the laws of different lands are often quite different.

Good results, that is, the effect of trade practices upon common welfare, are so extremely debatable that the English Courts at one extreme refuse to adjudicate questions of political economy while our American laws declare that any "stifling or supressing competition" is contrary to the public interest. Likewise, good motive, which requires a decision whether the intent is to obtain control over a market or simply a measure of self-defense, is much more liberally interpreted abroad where it is recognized that the pressure of competitive system often forces one firm to increase its business only at the expense of a competitor. Our Sherman law specifically forbids the *attempt* to monopolize. The English law is very concerned with good relations, the fourth element in competition, which is but lightly held in the United States. This involves the question of whether the acts are reasonable between the parties involved. The English assumption is that the law cannot give remedy to the fact that business is a battle, but that acts and contracts must be fair to both parties in the matter of "consideration," that, for example he who gives a special price or accepts an exclusive contract has received proper *quid pro quod*.

This very brief summary of the high legal points of competition indicates startlingly that whether our future economy is to be planned, controlled or unrestricted, our limitations of competitive conditions is of vital importance. It is clearly one of the basic problems of our new economic development, and one that very vitally affects the heavy industries, notably the chemical industry whose prices are so seriously and so quickly acted upon by the forces of supply and demand.

Convenient Containers For Chemicals Beginning with the multiple unit tank car and coming through to tanks with special linings or fabricated of special resistant alloys, there has been, during the past few years, a tremendous advance in the design, construction and material of containers for tank-car and tank-truck deliveries. So great progress has not been made among the smaller units. Lead and rubber-lined drums are the exceptions that emphasize the fact that the drum, barrel, box and carboy kept pace with the advances made by the makers of their larger cousins.

Three chemical men—a traffic manager and two local distributors—who have had a long, daily, practical experience with the many angles of the container problem were discussing this the other day at luncheon, and from out of their talk came two definite suggestions.

Why is it not practical on metal drums, particularly of the open-head type, to indicate, with a slight ridge, a gauge of contents indicating one quarter full, one-half full, in each instance, of course, indicating a certified number of gallons?

Why is it not possible to put into a carboy box a metal flask which would present an easily cleaned, rounded surface with no creases or corners, and which, if made of some light metal or lightweight alloy, would reduce the weight and certainly very much reduce the breakage?

Quotation Marks

The spirit of the New Deal has brought about a national sympathy for fair and liberal dealing with labor and a growing realization and acceptance by industrial management of the rights of labor and the importance to national welfare of its adequate remuneration. We are always and have been in harmony with this spirit . . . We are not in sympathy with paternalism—we try to be just, and maintain equitable relations with everyone who has a part in the building and sale of a Monsanto product. We recognize merit wherever evident by increased responsibility and proportionate remuneration. I believe our policies have instilled a loyalty and a belief on our employes' part that the management deals fairly with them. I am confident this redounds to the best interest of our stockholders.—*Edgar M. Queeny's Annual Report to Monsanto Stockholders.*

Technical Naphthalene Hydrogenation Products and Their Uses

By R. C. Bickmore, F. C. S.

THE value of naphthalene, already of great use as the starting-point for phthalic acid, naphthylamines, naphthols, naphthalene-sulfonic acids and other intermediates, has been enhanced by the realization of technical hydrogenation processes, converting it into "tetralin" and "dekalin," two liquids of considerable solvent power.

It seems a far cry from the original laboratory preparation of tetrahydronaphthalene, $C_{12}H_{10}$, by reduction of naphthalene with sodium in a solution of amyl alcohol, to the modern manufacture upon a technical scale, employing catalytic hydrogenation direct.

Sabatier and his collaborators, Senderens, Mailhe, and others, laid the foundation of the process by their brilliant theory and practical experiments on the general problem of hydrogenation and its application to the conversion of aromatic nucleus compounds into the corresponding compounds of the cyclohexane series. They found that naphthalene takes four, and ten, atoms of hydrogen, according to the temperature employed. They also noticed a catalytic dehydrogenation effect using a nickel catalyst, Sabatier stating in his "La Catalyse" that when naphthalene, in presence of carefully reduced nickel, at temperatures below 175° C., is treated with excess of hydrogen, it is practically completely converted into the decahydride (dekalin), boiling at 187° C., but that even at 200° C., this latter dissociates into the tetrahydride (tetralin), boiling at 205° C., and at 300° C. this latter in its turn is almost completely decomposed into naphthalene. Sabatier and Gaudron referred to this catalytic dehydrogenation effect by nickel in presence of hydrogen in the "Comptes rendus" in 1919.[1]

In Germany the manufacture of tetrahydronaphthalene (tetralin) upon a technical scale was successfully effected towards the end of the late war, and the asymmetric tetrahydronaphthalene is now manufactured by the Deutsche Hydrierwerke A. G., (originally Tetralin G.m.b.H.) at Rodleben near Rosslau, Germany, by a method based upon the work of G. Schroeter, von Gwinner, and Schrauth. Plant was installed to the daily capacity of 120 tons tetralin.

Schroeter specially purified the commercial naphthalene from sulfur compounds, e.g., thionaphthene (thiocoumarone, C_8H_6S), before hydrogenation. This is alluded to later.

R. Kutschenreuter[2] prepared mixed catalysts for the complete hydrogenation of naphthalene to decahydronaphthalene in liquid phase. If a metal of the iron group was present, tetrahydronaphthalene only was obtained. The catalysts used by Kutschenreuter were prepared of 80 parts nickel sulfate, 20 parts cobalt sulfate, 3 parts copper sulfate dissolved in water and precipitated with a 10 per cent. solution containing 55 parts caustic soda. The mixture of carbonates and hydroxides was washed, and reduced in a current of hydrogen, directly, or suspended in a hydrocarbon, or a solution of 20 parts nickel sulfate, 30 parts cobalt sulfate, and 6 parts copper sulfate in 2,000 parts water was precipitated with 10 per cent. solution of 50 parts caustic soda in presence of kieselguhr, and the precipitate treated as above. These mixtures of carbonates and hydroxides or mixtures of the corresponding formates in the same molecular proportions could also be used directly, without previous reduction. For instance, 1,000 kg. of naphthalene was heated with 5 kg. of a formate mixture and compressed hydrogen led in until a test portion of the liquid had all the properties of decahydronaphthalene: the yield was almost theoretical.

The work of Schroeter, and his co-workers on hydrogenated naphthalenes and their transformations is recorded in the *Annalen*, 1922.

The sulfur-containing bodies in commercial naphthalene (existing chiefly as thionaphthene, C_8H_6S, M.P. 31° C., which appears in naphthalene oil and in naphthalene, of which the boiling point is identical)[3], amount to 0.25 per cent. or more sulfur, and constitute a technical difficulty owing to their property of rapidly poisoning the hydrogenation catalyst. This sulfur difficulty was regarded by Fischer, Schneider

and Hilpert[4] as almost insuperable, even when using technically pure naphthalene.

The Schroeter process[5] included purification of the molten commercial naphthalene by treatment with finely-divided or easily fusible metals or alloys (such as the alkali metals) and distillation under reduced pressure or with quicklime or with metallic compounds in which the metal is not bound to an acid radicle, such as aluminum carbide, alkali amides, etc., distributed over porous materials exhibiting a large surface area, such as clay, kieselguhr, animal charcoal, or Fuller's earth. Nickel, iron, or other metals, suitably dispersed, may also be used.

The crude naphthalene is heated with one per cent. of the purifying material with stirring, in an autoclave at 150°-180° and subsequently distilled, under reduced pressure, from the injurious impurities[6]. More rapid purification can be effected by passing the vaporized material over the purifier, whereas complete purification, when necessary, can be effected by sulfonation and steam distillation.

For the hydrogenation catalyst, Schroeter suggested nickel, sodium, potassium, nickel carbonate, formate, and borate, cobalt and its corresponding salts, and nickel-and cobalt-copper mixtures.

The Aktiengesellschaft für Anilinfabrikation[7] utilize ordinary pressures, temperatures of 140°-150°, and catalysts of nickel, copper, manganese, and thorium oxides. The process involves the use of several reaction vessels in series, or a careful separation of entrained naphthalene from the waste gases.

In the process of F. Bayer & Co.[8] alkaline or alkaline earth metals are used as catalysts, together with a neutral solvent for the naphthalene, and alcohol as carrier of the hydrogen, acetaldehyde being produced simultaneously. This procedure is easily controlled, but hydrogen costs will be high unless a demand exists for the acetaldehyde produced. It is interesting to note that H. Broche and H. Schmitz[9] have used Silica gel as carrier for the nickel catalyst in the hydrogenation of technical naphthalene.

The purified naphthalene (512 g.) resulting from the Schroeter treatment is distilled into the hydrogenating autoclaves and treated with hydrogen at 180°-200° under pressure of about 225 lbs. (say 15-20 atm.) in the presence of a suitable nickel compound as catalyst (15-20 g.) deposited upon an inert medium. The hydrogenation proceeds, preferably, in two stages:—

(a) The production of tetrahydronaphthalene (tetralin) occupying 1-1½ hrs.
(b) The production of decahydronaphthalene (dekalin). This reaction is advantageously performed in another autoclave.

By distilling off the hydrogenated product, a further hydrogenation is carried out: 25 hydrogenations may be performed with one lot of catalyst.

A mixture of tetralin 20 per cent. and dekalin 80 per cent. has been placed upon the market as "Tetralin Extra" or "Tetralin Essence," (B.P. 190°C., flash point 140° F., and sp. gr. .900) and if necessary the tetrahydro derivative can be separated from the more highly hydrogenated derivatives by solution in liquid sulfur dioxide.

The Manufacture of Dekalin

The technical manufacture of dekalin proceeds by a continuation of the hydrogenation process used for producing the tetrahydro compound, and four hours are required for the conversion of 1 kg. of tetralin into dekalin under a constant hydrogen pressure of 12-15 atmospheres. In order to remove small quantities of tetralin and other impurities the product is digested with small quantities of sulfuric acid, separated from resinified products, washed, dried, and distilled[10]. Lower hydro-derivatives such as tetra-hexa- and octa-hydronaphthalene can be removed from dekalin by treatment with liquid sulfur dioxide in which the dekalin is insoluble[11].

The dekalin compound decomposes at above 200° C. into tetralin and hydrogen.

Manufacture of dekalin from naphthalene itself can be effected by conducting the hydrogenation at 180°-200° C. and 30 atm.

Properties and Uses of the Hydronaphthalenes

Tetrahydronaphthalene[5] has specific gravity 20°/4° C. 0.971, n_D^{20}=1.5434, B. P. 100°-101°C. (25 mm.), 206.5° (75 mm).

Its formula is $C_{10}H_{12}$ and it is an imperfectly saturated, colorless hydrocarbon liquid of pungent odor. The sp. gr. is generally stated for commercial uses as 0.917, and its B. P. as 205° C. Flash Point 79° C. It is soluble in ether and alcohol, but insoluble in water. It has marked solvent powers; thus is used as a solvent for resins, waxes, fats, rubber and oils, and as a substitute for turpentine[12] in varnish and polish making. Tetralin mixed with amyl alcohol and other solvents is useful for the removal of dried paint films, varnishes[13], etc.

Comparative experiments with turpentine, tetralin, and a tetralin-benzine (3:1) mixture in white lead, lithopone and metallic ochre paints showed that they had equal drying properties, drying to hard-films on both glass and oiled wood in 20 hours. When used as a substitute for turpentine in paints, it is important to take care that the ingredients are quite free from manganese, as otherwise, it is stated the white paints so made show a tendency to redden.

Tetralin is also employed in a number of oil varnishes for both interior and exterior work. The red-tinting complained of in certain white varnishes in which tetralin is used is not due to the tetralin, but probably to some adulterant of one of the resins employed, to a resin actually present in the wood employed, or to presence of traces of sesame oil[14].

It has been used as a wash oil in the extraction of benzol from coal gas and in the recovery of solvent vapors, e.g., in the Bregeat absorbing process, as a substitute for cresol[15].

It has a considerable solvent power towards sulfur, dissolving three per cent. of its weight of sulfur at ordinary temperatures, and 40 per cent. at 100° C. On account of this fact, tetrahydronaphthalene can be used for extracting sulfur from spent oxide as produced in gas purification.

Tetrahydronaphthalene has, similarly, a marked solvent action upon naphthalene. By the addition of a small quantity of tetralin to city gas, using cold spraying or vaporization, the solid naphthalene blockage masses are dissolved in the gas distribution mains, and the liquid resulting is easily drawn off: further, the mains are protected against internal corrosion, as the tetralin is absorbed by the iron hydroxide, forming a film impenetrable to water and oxygen.

Tetralin has been found a valuable crystallizing medium, particularly for substances which dissolve with difficulty in other solvents. It is sometimes used for removing printer's ink from waste paper.

Tetralin is sometimes mixed with *a*-tetralone (a product derived from treating tetrahydronaphthalene in acetic acid, with chromium trioxide in dilute acetic acid, and subsequent steam distillation) when a solvent for lacquers is required.

As a fuel for internal combustion engines, mixtures of the hydronaphthalenes with suitable cyclo-hexanes (e.g., 50-70 per cent. of methylcyclohexane and 50-30 per cent. of tetrahydronaphthalene) have been utilized.

Decahydronaphthalene after purification by means of sulfuric acid has specific gravity 18°/4° 0.8842, boiling point 189°-191° (770 mm).

Its formula is $C_{10}H_{18}$, and it is a fully saturated hydrocarbon liquid, of aromatic odor resembling that of camphor. Flash point, 51.6° C. Refractive index 1.4815 (n_D^{20}). Viscosity at 40° C. (100η) = 0.675.

Like tetralin, it has marked solvent powers, being used in certain cases instead of turpentine, and dries more slowly, which is advantageous in some instances. The relative rate of evaporation compared with American turpentine 1:2.89; percentage residue on evaporation 0.001935, compared with 0.1516 for turpentine.

Dr. Coleman[16] found that technical dekalin consisted, chemically, of a mixture of tetrahydronaphthalene 20 per cent., and decahydronaphthalene 80 per cent.

Hydrogenated naphthalenes, alone or mixed with other illuminants, burn with a flame of high luminosity. The addition of dekahydronaphthalene to benzol increases its energy. The freezing point of 90 per cent. benzol + 10 per cent. dekalin = −3°C., whereas a 70:30 per cent. mixture has freezing point of −20° C.

It is used for removing stains from garments and as a cleansing fluid for machinery (particularly printing machines). Dekalin has found application in lamp, motor, and lubricating oils. In this connection, although the calorific value of dekalin is 10,800 as compared with 10,000 for benzene, the high flash point is a serious objection, and under normal conditions these hydronaphthalenes could not compete with motor fuel.

Derivatives of Hydrogenated Naphthalenes and Their Uses

Nitration, sulfonation, and bromination processes each yield commercially important derivatives of tetrahydronaphthalene, such derivatives themselves leading to further valuable compounds.

According to the extent of the nitration, may be formed the mononitrotetrahydronaphthalenes (catalytically reducible to the corresponding amino-derivatives) or the dinitro compounds which, on catalytic reduction, yield the corresponding diamino-compounds[17]. The nitro-bodies have desirable characteristics with reference to their use in explosives.

G. Schroeter, Svanoe, H. Einbeck, H. Geller and E. Riebensahm, in working on the tetrahydronaphthalene-sulfonic acids, tetrahydronaphthols and their derivatives[18], opened the way to the preparation of a large number of new aromatic compounds by sulfonation of tetrahydronaphthalene.

Examples of technically important derivatives are, 2-tetrahydronaphthol methyl ether, a perfume, 2-tetrahydronaphthol and its 1.3-dibromoderivative, disinfectants even in dilute solution: and 2-tetrahydronaphthol-3-carboxylic acid, which is a stronger febrifuge than salicylic acid.

G. Schroeter prepared also[19] the compound *a*-ketotetrahydronaphthalene, (*a*-tetralone)

$$\begin{matrix} CH & < & CH_2.CH_2. \\ 64 & < & CO.\ CH_2. \end{matrix}$$

a colorless liquid with aromatic odor, of sp. gr. (at 17° C.) 1.095, and B. P. 257° C. (at 760 mm). It is used for the preparation of drugs and perfumes, and mixed with tetrahydronaphthalene as a solvent for lacquers (see under "Properties and Uses of the Hydronaphthalenes").

Dyestuffs derived from *a*-tetralone were prepared by W. Herzog and J. Kreidl, chief of the products being 2-tetrahydronaphthalene-2-indoleindigotin, obtained by heating equivalent quantities of *a*-ketotetrahydro-naphthalene and *a*-isatinanil under reflux in presence of light petroleum (B. P. 150-200° C.). It forms bluish-violet crystals with a bronze reflex, and decomposes at about 250° C. It is transformed by fuming sulfuric acid into a sulfonic acid which gives a pure blue solution in water. With alkali and hydrosulfite it yields a yellow vat from which wool and cotton are dyed in pure blue tones.

The Tetralin Ges.m.b.H.,[20] working on the hydrogenated anthraquinone derivatives, prepared, from ar-2-methyltetrahydronaphthalene (B. P. 219°-220° C.), a substance 3-methyl-tetrahydro-2. 1-naphthanthraquinone, M. P. 119° C. Compounds of this nature serve for the manufacture of dyestuffs and drugs. They produced tetrahydronaphthanthraqui-

none from tetrahydronaphthalene and phthalic anhydride in the presence of benzene and aluminum chloride at 60°-70° C., which gave β-tetrahydronaphthoyl-o-benzoic acid M. P. 153°-155° C., which, on dissolving in cooled fuming sulfuric acid and subsequent heating to 100° C., yields the *a*- and β-tetrahydronaphthanthraquinone, separable by fractional crystallization.

Tetralin is easily directly brominated and from the dibromide (crystalline solid, M. P. 71°-72°) can be obtained a useful series of compounds[21].

Tetrahydronaphthalene, when treated with alkyl bromides at 120°-130° C. in presence of aluminum bromide, yields alkyltetrahydronaphthalenes. β-diphenylbutane, M. P. 52°, is obtained by condensation of benzene and tetrahydronaphthalene in presence of aluminum bromide and chloride[22].

A paper on the alkamine and ether-bases of the tetralin series is due to Braun and Weissbach[23].

From tetrahydronaphthalene, a peroxide has been manufactured by the Soc. Chem. Ind. in Basle[24], 1: 2: 3: 4 tetrahydronaphthalene is heated with oxygen or air at below 100°, or if a catalyst (iron filings) is used, below 60°, to give the 1-peroxide, $C_{10}H_{11}.O.OH$, of M. P. 53°-54°.

Economics of Production of the Hydronaphthalenes

The economic aspect of the production of the hydronaphthalenes depends upon the cost of raw materials, the state of the technique of manufacture, the price and efficiency relation between the hydronaphthalenes and those products for which they can be used as substitutes, and upon any new industrial applications.

In the past, efforts have been made in the direction of cheapening the raw materials used, e.g., to use crude naphthalene, or water gas or coke oven gas instead of hydrogen[25].

The hydrogenation of naphthalene has become part of the great scheme for hydrogenation of coal-tar products, and the incidence of the other processes and products will determine the position of the hydronaphthalenes.

The basic price of naphthalene, however, strictly controls the production of the hydronaphthalenes, and in Europe the tendency is for naphthalene to appreciate in value. This is due to more than one factor. More vertical retorts are being installed, with consequent smaller production of naphthalene. Supplies are becoming scarcer due to general curtailment in by-product coking operations. Coal-tar products as a whole have declined in Great Britain; whereas British exports of naphthalene have been maintained, imports have declined: Germany has very little available for export. At the same time, as a heavy demand exists for high-grade naphthalene, chiefly along the lines of manufacture of azo-dyestuffs, phthalic anhydride (vapor phase catalytic) and synthetic glyptal-type resins.

Unusual or artificial economic conditions may see the hydronaphthalenes used—as in Germany where tetralin was employed as a substitute—for petrol, but their chief and more logical applications seem to lie in the direction of solvents and as valuable adjuncts in the paint and varnish industry.

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Production of Pyrites in 1933

Production of pyrites amounted to 274,476 long tons, valued at $755,420 in 1933, compared with 186,485 tons, valued at $492,043 in 1932, an increase of 47 per cent. in quantity and 54 per cent. in value. Production in 1931 totaled 330,848 tons, valued at $974,820.

Virginia was the largest producing State in 1933. Other states that produced pyrites in 1933 were California, Colorado, Missouri, New York, Tennessee, and Wisconsin. Missouri increased its output of pyrites from 3,958 long tons in 1932, to 18,355 tons in 1933, a gain of 364 per cent. The production in 1932 was from one mine, whereas that in 1933 was from four properties. The output of pyrites in Missouri in 1932 was the first tonnage reported since 1920. There was a production of 19,824 long tons of pyrites concentrates in New York in 1933, an increase of 2,953 tons, or 18 per cent. over the 1932 production.

Colorado shipped 4,059 long tons of pyrites in 1933 from the mill-tailings dump of the Colorado Zinc Lead Mill in Lake County. In 1932, 1,496 tons were shipped from this property.

In 1933 the quantity of pyrites sold or consumed by producing companies totaled 272,748 tons, a gain of 47 per cent., compared with 185,654 tons in 1932. The amount sold or consumed in 1931 was 330,145 tons. The pyrites produced in 1933 contained approximately 102,969 long tons of sulfur; in 1932 the output contained about 64,826 tons of sulfur, and in 1931, 121,503 tons. The average price of pyrites, as quoted by trade journals, was 12-13 cents per long-ton unit throughout the year. Imports of pyrites in 1933 were 374,417 long tons, an increase of 48 per cent., compared with 253,248 tons imported in 1932. Of the quantity imported in 1933, Spain furnished 341,878 tons, Canada, 29,970 tons, and Soviet Russia, 2,569 tons.

Abrasives
in Metal Polishes

By Cyril S. Kimball
Foster D. Snell, Inc.

METAL polish must primarily clean and secondarily produce a lustre. Cleaning requires the removal of both grease films and corrosion; polishing the leveling off of the surface to one having fine parallel striations. One must consider relative particle size and settling characteristics of abrasives, the sharpness of the abrasive, the protective colloidal action of emulsion stabilizers, the electrical charge on the suspended particles, the function of buffering agents as affecting the cut of the abrasive, the formation of metallic soaps on the metal surface cleaned, even the suspending and carrying away of the particles of corrosion removed by the polish.

The term metal polish is practically synonymous with brass polish. Although manufacturers often put up the same product in another can labeled "nickel polish," in general the products are too harsh for silver and gold. They are used, however, on bronze and on other miscellaneous metals, even chromium plate. The products used by the plater for cutting or polishing do not fall in this classification; they are known in the trade as buffing compounds.

The importance of metal polishes might seem to be minor. That is contradicted by incomplete data, which place the value of the annual production at over $2,000,000.

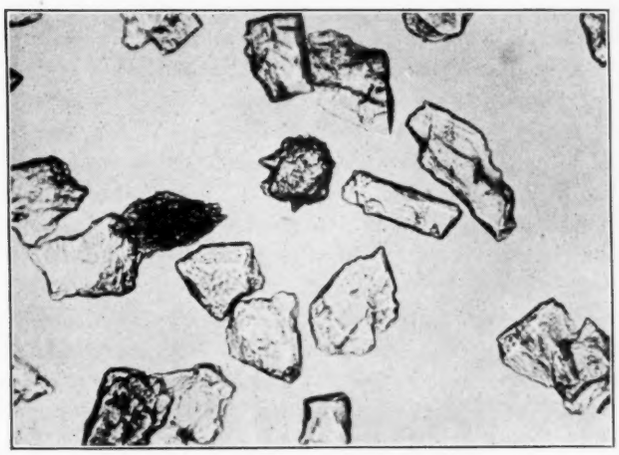
The literature on metal polishes consists largely of patents[1]. Those, though numerous, are largely issued to non-technical inventors, and no important brand is covered by an issued patent. As a matter of fact, patents are largely on compositions which do not even approximate the commercial products, but this by no means indicates that a new development in metal polish may not be the subject of a patent.

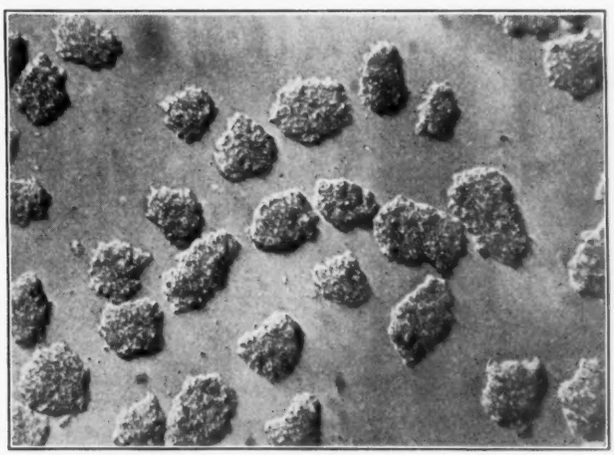
Four competitive types of liquid polishes are sold on the American market. Each has its virtues and its defects. A technical classification of these types would be

(1) neutral, naphtha-base metal polish
(2) naphtha-base ammonia type metal polish
(3) water-base, pine-oil type metal polish
(4) water-base, ammonia-type metal polish

These types include 99 per cent. of the sales of liquid metal polish.

Probably the oldest type of metal polish which still is on the market is the neutral, naphtha-base type. This product dates from the idea of mixing some silica and gasoline together and applying it as a polish. The gasoline serves to cut any greasy or oily film on the metal and the silica then removes corrosion by mechanical abrasion. All the present day products of this type also contain fatty acids, usually of a relatively high melting point.





Figures 1, left, and 2, right, are photomicrographs of two different types of silica.

The purpose of the latter is twofold; first to impart a better lustre to the metal; second to reduce the tendency to subsequent corrosion. The solid fatty acids, which are waxy in character, react at the metal surfaces under the heat of friction to form metal soaps which are water insoluble. The thin film of soap thus formed on the surface protects it, to a certain degree, from rapidly corroding again. These films have the further property of imparting "color" to the metal. This is particularly true of nickel because the soap film has a characteristic bluish hue adding depth to the lustre and counteracting the hazy silver color of the pure metal. It is probable that not only does part of the film of fatty acid react with the metal but that a portion is also spread into the striations filling up the smaller ones and thereby producing a more level surface and better light reflection.

Below, photomicrographs of scratching on brass.

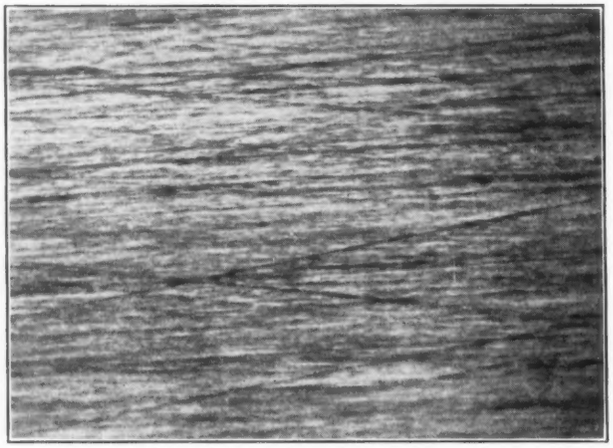


Figure 3. Dull—abrasive too mild.

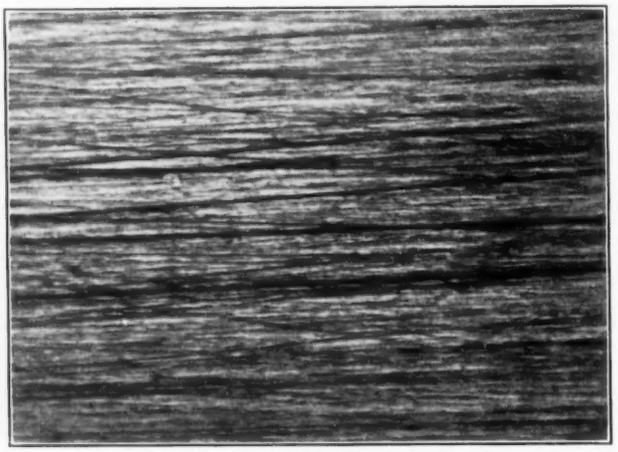


Figure 4. Scratched—abrasive too coarse.

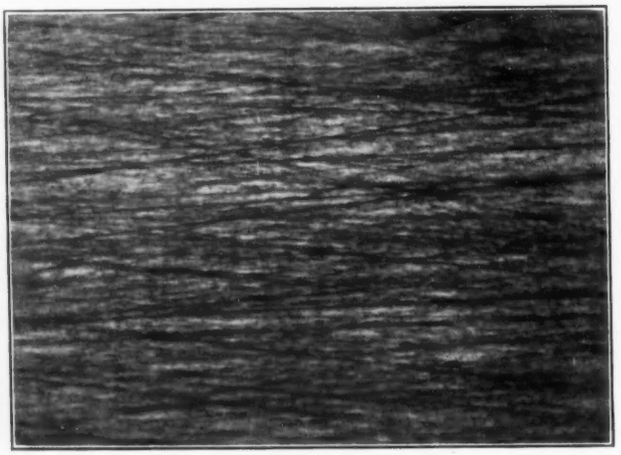


Figure 5. Polished—proper abrasive.

It is almost a universal practice to apply this type of polish, rub to loosen the corrosion, allow the vehicle to dry and then wipe off with a clean rag to remove corrosion and to polish. As so used, the vehicle serves to wet the surface of the metal, to remove grease and oil and as a method of application of a powder to the surface for polishing.

The products of this class are efficient. If the silica is properly selected they produce a good lustre. They are subject to two trade objections. With the exception of two or three brands, the silica is not in permanent or even semi-permanent suspension. In a few cases it even cakes hard in the bottom of the container, a defect which can be avoided by proper formulation and manufacture. The settling of this type of product is particularly noticeable in one gallon cans and excludes the possibility of selling in any individual container larger than the one gallon size. These polishes are also subject to the fire hazard introduced by the use of a naphtha or gasoline vehicle. There are but few standard brands of polish of this type.

Somewhere, sometime, someone had the idea of stabilizing the neutral naphtha-base metal polish with soap and thus produced a new type. In its ultimate development, the products are stabilized with ammonia soap produced *in situ*. As so produced, the suspension is only relatively, rather than completely, stable in most cases.

Some brands of this type of product have made a rather striking success. The number of this type on the market is long as compared with the previous type but relatively few as compared to the water-base polishes.

In the ammonia naphtha-base, or pink ammoniated naphtha polishes as they are often called, an excess of free ammonia is always present. The reason for this is obvious when we consider that some, if not all forms of copper and nickel oxides and hydroxides are soluble in aqueous ammonia and certain salts of ammonia. It is interesting by contrast that aqueous ammonia will corrode brass or nickel if it is left in contact with the metal for a period of time. This happens because the ammonia continues to react with the metal after the maximum solubility of the metal hydroxides has been reached. The film of hydroxides then remains on the surface of the metal.

Although these polishes contain no higher fatty acids as such the same principle discussed above, relative to the function of these acids, holds true. Ammonia soaps are unstable; they break down on exposure to air liberating free ammonia and leaving the

fatty acid. Thus when the polish is applied to a surface the ammonia volatilizes during the cleaning and polishing operation and some of the fatty acid remains. Theoretically ammoniated naphtha-base metal polishes should clean and polish more readily and better than the neutral naphtha-base polishes. The former contain all of the ingredients found in the latter and in addition ammonia, a chemical cleaner. In the trade they are considered to be about equal or slightly inferior to neutral naphtha polishes. They do cut deep seated corrosion more quickly. The usual complaint made against them is that they are gummy and difficult to remove from the metal surface. The explanation of this probably is that greater amounts of heavy metal soaps are formed due to the ammonia reacting with the metal and metal oxides to form hydroxides. The metal hydroxides in solution or in suspension replace the ammonia which volatilizes with time, in the ammonia soaps. Heavy metal soaps are characterized by their sticky gummy nature. Any large excess of metal soap remaining on the surface after polishing dulls the lustre.

These polishes are used in the same manner as the neutral naphtha-base polishes, that is allowed to dry before wiping off and buffing with a clean rag. The main advantage they possess is that when properly manufactured the abrasive does not settle out to form a hard cake.

Water-base Metal Polish

For some reason lost in the history of the industry, this type of product has always been colored pink. Practically every manufacturer used the same water soluble dye, rhodamine, for a period of about ten years. Practically every manufacturer had the same trouble. After standing on the shelf for a few months the pink shade turned to a yellow or to muddy brown. It had no significance as to the behavior of the product but the consumer's reaction can well be imagined. Today the manufacturer of these products colors them pink and they stay pink, using more resistant oil soluble dyes or pigment colors.

A water-base metal polish is a modified form of a mixture of silica with water, instead of naphtha. The water base pine-oil type can be passed over quite briefly. This product consists essentially of a rather sharp silica held in suspension by an emulsion of pine oil in water, that emulsion in turn being stabilized with soda soap. Whether preferential wetting of the silica by the pine oil is involved is problematical. When one considers the process of manufacture employed by some manufacturers it would appear that such is not the case. Probably the emulsified pine oil acts to thicken the vehicle and hence by mechanical action as well as protective colloid action, the silica is permanently suspended.

This type of water base polish is the oldest in commercial use and the cheapest polish to produce. A few years ago it had a wide distribution. Since then it has gradually dropped out of the market, so that recently, only one important manufacturer of metal polish sold this type in substantial quantity.

A pine oil producer has been endeavoring to exploit this type of product as a market for his pine oil. The success of that effort over a period of nearly a year has been indifferent. The defects of the product, which will continue to bar it from wide distribution until some important technical improvement is made in it, are a relatively high viscosity which makes it wasteful in use, the lack of any chemical cleaning properties and the characteristic clinging pine oil odor. The user of metal polish prefers a chemical rather than an "armstrong" cleaner provided the material offered is not such as to conflict with his preconceived ideas of what is safe. The pine-oil type polishes are the least efficient, that is require more labor to produce a good lustre, than any of the other liquid polishes.

The most important kind of liquid metal polish, in terms of volume sold is the water-base, ammonia type. This is an aqueous suspension of silicious abrasive in water stabilized with soap. From a technical viewpoint the usual procedure is to stabilize the suspension with ammonia soap produced *in situ* with the addition of excess ammonia. Frequently the product also contains a heavy metal soap produced during the process of manufacture as an additional stabilizing agent. Colloidal clays are frequently employed as suspending agents. Some of the salts of ammonia are advantageously used as stabilizing agents and in conjunction with soap. This allows for the use of less soap and results in a less viscous polish. Ions from the ammonia salts are probably absorbed by the silica and by virtue of the particles all having like electrical charges they repel each other causing a better suspension. The ammonia salts of some organic acids are particularly beneficial because not only do they aid in stabilizing but they exert a definite chemical cleaning action superior to that of ammonia alone. It is of interest to note that the U. S. Navy requirements for metal polish have been revised to take cognizance of this property. In order to pass the new specifications a polish must chemically remove corrosion artificially produced on brass by treating it with ammonia.

Radical Progress of Change in This Product

The progressive change in this type of product during the past fifteen years is striking. The product is not much older than that. The early products offered were rather thick and viscous. The cause of this appears to have been the necessity of using relatively large amounts of stabilizing agent and producing a considerable viscosity in order to reduce the tendency of the abrasive to settle. This defect is still true of the other water-base type. There has been a steady reduction in the viscosity of the finished product, a change which has produced a corresponding improvement in the product. As a result of this

mechanical improvement, less and less of the product has been required to polish a given area of metal. The limiting factor in this is not the amount of abrasive required for a given area but rather how little of the product you can put on the polishing cloth, a factor which is very wasteful with a thick product. The present day ammonia water-base metal polishes, some of which are nationally advertised, are efficient and produce a very good lustre. Usually they do not produce as much "color" on the metal as the naphtha base polishes.

Ammonia Water-base Polishes Non-inflammable

A major advantage possessed by the ammonia water-base polishes is that they are non-inflammable. This allows for the manufacture of them in factories and areas where the naphtha types would be prohibited and for the storage of them by the manufacturer, dealer and consumer without danger or restriction. The usual criticism is that they cling in the cracks and interstices of the object polished. They are usually applied by rubbing to loosen corrosion and clean the surface and then wiped off while still wet. This contributes to the adhesion in the indentations of the metal surface. The viscosity of the polish, which is dependent upon the amount and character of stabilizing agents used, also influences the extent to which they deposit in cracks and crevices.

A recent modification of this type of product is a metal polish in powdered form which can be sold to the consumer or to the manufacturer. It contains all of the essential ingredients for a water-base ammonia type metal polish. When mixed with water the powder produces a stable polish, equal in quality to the standard products. The advantages of the powdered form of metal polish are that an appreciable saving in expense, due to saving transportation charges for water and the cost of tin cans, can be passed on to the consumer. The powder can be packaged in relatively inexpensive cardboard cartons. The development is too new for marked success as yet. A steady increase in sales volume indicates future general trade acceptance of the product.

Water-base metal polishes which are acid instead of alkaline have been offered intermittently with no marked success, in the sense of their adoption by competitive manufacturers. One manufacturer is actively offering a new acid-type polish on the market. His probable success cannot be predicted as yet. The most serious objection to the acid-type of polishes is that the public believes that any acid metal polish is dangerous, harmful and corrosive. These objections need not be true if the proper acid is selected.

The question is a complex one as to why four distinct types of liquid polish continue to compete in the trade. New York City and some other large cities have such definite restrictions against the storage of a product containing naphtha that, regardless of quality, it would be unwise for many users to store the naphtha type of metal polish in their places of business. The pine-oil type is inexpensive to manufacture, followed closely by the water-base ammonia type. The difference in the cost of manufacture of the finished product between the two general classes, water-base and naphtha-base, is not as great as one might expect considering that the vehicle for the first one costs nothing and the vehicle for the second one costs several cents a gallon even when purchased in tank-car lots. The reason the spread in cost is less than would be anticipated is that the same efficiency can be obtained with the naphtha-base products containing a much smaller percentage of silica and that the cost of necessary chemicals is higher in the water base polishes.

Special Polishes

There are many specialized polishes which can be referred to only in passing. The polishes claimed to be free from abrasive either are incorrectly described or are like automobiles without gasoline. Special chromium polishes, sold largely on demonstration as polishing and plating agents, usually depend on the old chemical trick of a more active element displacing mercury from a solution of a mercury salt to form an amalgam.

A few years ago workers in one of the Government departments made the discovery that an organic liquid, orthodichlorbenzene, would dissolve significant amounts of certain metal oxides without any appreciable corrosive effect on these metals[2]. A careful check up proved that this liquid was entirely unsatisfactory as a substitute for metal polish. Besides being considerably more expensive than metal polishes it does not attack corrosion readily enough and fails entirely to compete with them. A few manufacturers incorporate small amounts of this liquid in their polishes. The trade in general has rejected its use on the grounds that the possible advantage of using it in polishes is out of all proportions to the cost.

In the past cyanides have been used in metal polishes. Federal and state legislature, some of which relates to Workmen's Compensation Laws, has been largely responsible for the elimination of the use of cyanides, butter of antimony and other poisonous ingredients. At the present time there is no excuse for a manufacturer using these poisonous substances—satisfactory polishes can be made without them. Nitrobenzene continues to be quite extensively used for its odor in neutral naphtha-base types. The amount is small enough to avoid serious health hazard.

The metal polish industry, like every other, has its graveyard and its tottering octogenarians. Around 1920 there appeared on the American market a paste polish for cleaning nickel, usually spoken of as a rain spot remover because of its major use in removing rain-spots from nickel plated automobile radiators. This was quite different from any other product then on the market. One rumor had it that the original

product was imported from Alsace Lorraine, another that it was developed domestically. In any case its derivation was clear. It was composed of Vienna lime in a grease base, a product which had been known and used as a buffing composition on nickel for a long time. For the consumer's use in polishing nickel, it was only necessary to make the product softer so that it could be put out in tin cans and rubbed in with a rag. Unfortunately most of the manufacturers were not chemists and did not appreciate the property of lime of absorbing carbon dioxide and moisture from the air. Therefore, many cans of this product swelled and burst. The technical problem involved was overcome after a period of experimental sale and the product was widely distributed by many manufacturers. It is now in the graveyard, with chromium plating indicted for its murder.

The public is fickle in its taste. Not many decades ago it switched its preference from tooth powder to tooth paste and today for reasons which are vague, but guessable, it is retracing its steps. So in metal polish, the paste polishes had their day and would be extinct were it not for specific uses for which the liquid is not found satisfactory. The type frequently referred to as "Putz" consisting of silica in a grease base of varying consistency, would be found a decade ago in the hands of many porters polishing brass door knobs, and brass signs. Today the liquid polishes described above have largely displaced the pastes. There is, however, a field where the paste remains and can be expected to hold its own, namely, the polishing of brass work on engines where, due to the elevated temperature, the liquid simply dries up and is not satisfactory.

The properties which make paste polishes objectionable for general purposes are their gummy nature and the fact that a considerable amount of rubbing is required to remove the excess grease in order to produce a brilliant lustre. In addition these polishes are difficult to apply at low temperatures, that is below 70° F.

Abrasives

One familiar with the abrasive industry might list six or eight abrasives as candidates for the metal polish business. In practice only one, silica, either in the form of a ground crystalline silica or in the form of a pumice or pumicite, has been extensively used. The selection of the proper abrasive between these two types of silica, present in the market in at least a dozen distinct variations, is complex. The heavy water-base ammonia type of metal polish and the water-base pine-oil type require a sharp silica. As the water-base ammonia type product became thinner in consistency with technical developments in the method of stabilizing it, there has been a corresponding necessity for decreasing the sharpness of the silica used in order to avoid excessive scratching. The neutral naphtha type product must use a milder form of silica because it has practically no other ingredient present to "buffer" the sharpness of the silica and thus prevent scratching. The same thing is substantially true of the majority of the naphtha-base ammonia type polishes. The accompanying photomicrographs illustrate two distinctly different types of silica which, as expected, are useful in quite different types of products.

Polishes with Scratching Properties

Many manufacturers advertise a metal polish that will not scratch. Many purchasers buy a metal polish which is claimed not to scratch. Only a small percentage of either manufacturers or users appreciate that scratching is necessary to produce a satisfactory lustre. The accompanying photomicrographs, Figures 3, 4 and 5, show the degree of scratching of brass which will be interpreted by the eye as a polish or lustre. As shown, somewhat more scratching will be referred to by the consumer as "scratched". A lower degree of scratching, from an abrasive which is too mild, does not give a good lustre.

If the Federal Trade Commission should ever run out of work it may even force some of the metal polish manufacturers to modify their statements. They can then change "does not scratch" to "it scratches enough and not too much."

Sales

The few large firms specializing in the manufacture of metal polish could be counted on the fingers of one hand. Other large manufacturers, however, include substantial amounts of metal polish production in their total manufacture and sale. Many others sell a little. The less than two hundred manufacturers of metal polish listed in a standard trade directory are no measure of the total number of manufacturers. The total figure is probably nearer 1,000 than 500. Perhaps an indication of the importance of the industry may be indicated by the recent purchase of one of the large metal polish companies by an alcohol company, the purchase presumably made because that metal polish includes a small amount of alcohol.

The channels of distribution of metal polishes are numerous. Much is sold direct to large users, such as building superintendents. Janitors' supply houses distribute some. Grocers sell a large volume. Fixed-price chains and department stores sell some more. Hardwares, garages, and a multitude of minor outlets sell most of the balance. It is hawked from house to house by agents as part of lines of household chemical products or as an adjunct to brushes. In special forms it is even sold by pitchmen on the public streets.

As so often occurs with products with a definite market, the manufacturer of metal polish has frequently tried to expand his market by broadening the use of the product. Many liquid metal polishes are recommended on the can for silver and gold. Their

use for this purpose is negligible because they are too harsh. One manufacturer recommends his product for window cleaning and another puts up his metal polish in another can with another label, recommending it for cleaning windows. These are both water-base ammonia-type polishes and do not do a bad job, thanks to the ammonia and the absence of soda soap. The climax is the recent request of one metal polish manufacturer to be included under the NRA in the "cleanser code" on the ground that his product was a cleanser and as such was in competition with all other cleansers, such as Old Dutch Cleanser, Bon Ami, silver polish, etc.

Future Metal Polish Consumption

What of the future? The day of brightly polished brass door knobs and automobile radiators has passed. Brass and nickel objects are still numerous however. Will they all disappear in time, leaving us a chromium plated, aluminum and stainless steel world? It is significant that many non-tarnishing metals, such as monel, stainless steel and aluminum, require polishing to maintain a satisfactory lustre. Their polishing is no small problem, either technically or in terms of volume.

Instead of metal polish disappearing, therefore, it is more probable that when technocracy arrives the perfect robots will occasionally have to polish each other and the equipment they operate.

1. Foster D. Snell, *Soap*, December 1932, January 1933.
2. P. H. Groggins and Walter Scholl, Ind. Eng. Chem., *19*, 1029 (1927).

Sulfur Production in 1933

Production, shipments, and exports of sulfur in 1933 showed large increases in comparison with 1932 in a statement issued by the Bureau of Mines. Production was 58 per cent., shipments 48 per cent., and exports 48 per cent. higher in 1933 than in 1932, but they were 29 per cent., 9 per cent., and 10 per cent., respectively, below the averages for the five-year period 1928-1932. Shipments exceeded production; consequently stocks at the mines were reduced. Production of sulfur was reported from California, Louisiana, Texas, and Utah.

Sulfur output amounted to 1,406,063 long tons in 1933, a gain of 58 per cent., compared with the output in 1932 of 890,440 tons. Shipments increased from 1,108,852 tons, valued at about $20,000,000 in 1932, to 1,637,368 tons, valued at about $29,500,000 in 1933, or 48 per cent. in both quantity and value. Stocks at the mines on December 31, 1933, had decreased to 2,799,950 tons, or 231,310 tons below the reserve at the close of the preceding year.

The new property of the Freeport Sulphur Company, in Louisiana, was put into operation during the year. A production of 17,705 long tons was reported by this company but no shipments were made. The Jefferson Lake Oil Company, Inc., also in Louisiana, increased its production from 13,401 tons in 1932, to 303,787 tons in 1933. No shipments were made in 1932 but in 1933, 128,916 tons were shipped.

Texas produced 1,083,445 tons of sulfur in 1933, or 77 per cent. of the country's total. In 1932 Texas produced 98 per cent. of the country's total, or 876,294 tons. The properties that contributed to the production in 1933 were those of the Duval Texas Sulphur Co. at Palangana Dome, Benavides, Duval County; Freeport Sulphur Co. at Bryan and Hoskins Mounds, Freeport, Brazoria County; and the Texas Gulf Sulphur Co. at Long Point Dome, Long Point, Ft. Bend County, and at Boling Dome, Newgulf, Wharton County.

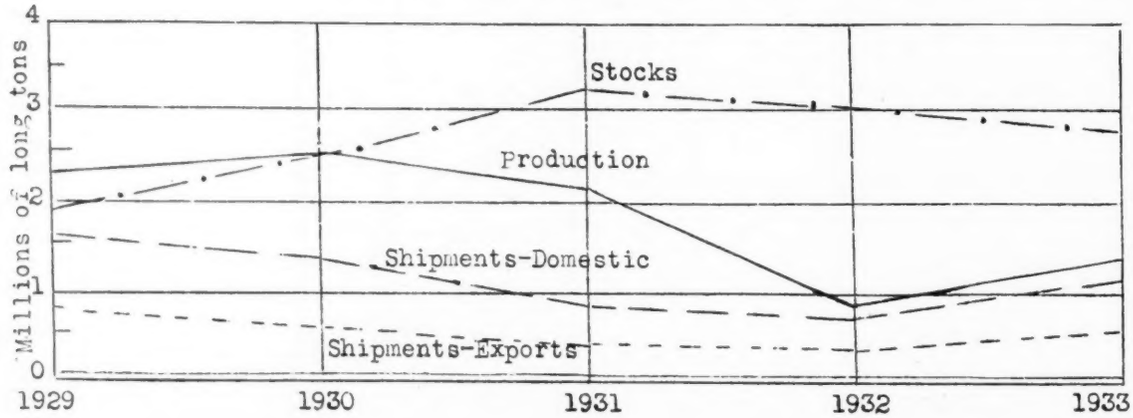
Production of sulfur in California and Utah amounted to 1,126 long tons in 1933.

Prices Quoted

The average quoted price for sulfur as reported by the trade journals was unchanged at $18 a ton f.o.b. mines throughout the year. Spot prices for car lots were $21 a ton and prices for sulfur exported were given as $22-$25 a ton f.a.s. Atlantic ports.

Imports of sulfur ore amounting to 4,773 long tons were recorded by the Bureau of Foreign and Domestic Commerce in 1933. This is the first time that sulfur has been imported into the United States since 1930, at which time 29 tons of "sulfur and sulfur ore" were recorded.

Exports of sulfur or brimstone in 1933 totaled 522,515 long tons, compared with 352,610 tons in 1932, an increase of 48 per cent. Exports to all the countries that receive important quantities of American sulfur, with the exception of those to Australia and New Zealand, showed increases. Australia and New Zealand received much larger quantities of sulfur from the United States in 1932 than in 1931, while the other important consuming countries showed large decreases. Canada received 122,954 tons in 1933, compared with 95,800 tons in 1932; France, 84,093 tons, compared with 60,591 tons; Germany, 69,139 tons, compared with 31,275 tons; United Kingdom, 47,149 tons, compared with 18,129 tons; Australia, 37,726 tons, compared with 60,809 tons; Netherlands, 27,449 tons, compared with 13,959 tons; New Zealand, 26,446 tons, compared with 33,654 tons. Shipments of United States sulfur to the United Kingdom in 1933 were the largest ever recorded. Exports of crushed, ground, refined, sublimed and flowers of sulfur in 1933 were 19,629,405 pounds, an increase over the 16,285,095 pounds exported in 1932. The principal importing countries were Canada with 5,161,960 pounds; Australia, 2,316,670 pounds; Germany, 2,016,392; United Kingdom, 1,452,058 pounds; Mexico, 1,153,116 pounds; and Uruguay, 1,013,600 pounds.



Domestic production, shipments for domestic consumption, and for export, and stocks of crude sulfur, 1929-1933.

Aluminum Drums for Chemicals

By H. V. Churchill
Chief Chemist, Aluminum Research Laboratories, Aluminum Company of America

The new type aluminum drum (right) has the circumferential welds removed about 5 in. from the ends, while the old type had the welds at the head edge and were re-enforced with a chime ring.

THE medieval alchemist, surrounded by alembics, retorts, and the musty tomes of Geber and Paracelsus, knew *aqua fortis* as a diabolical liquid to be imprisoned in glass or glazed earthenware. Until comparatively recently, few materials were known that could resist the action of strong nitric acid. Accordingly glass carboys have long continued to be the standard container for the *aqua fortis* of the ancients. No one dreamed that it would some day become possible to ship this most powerful reagent in any other metal than gold or platinum. Much less did Oersted suspect that the metal he ushered into the world would ever threaten to replace the carboy.

The story of aluminum drums for chemicals began with a much milder liquid, acetic acid. The pioneers in the synthetic production of acetic acid from calcium carbide had adopted aluminum apparatus for distilling acetic acid, because the resulting product was exceptionally free from the heavy metals. This was a Canadian development and the acetic acid made first found a market in England. Why, then, they reasoned, should we not carry our idea to its logical end and ship our product in aluminum drums since overseas transportation demanded stronger containers than glass carboys? From drums the use of aluminum for shipping acetic acid extended to tank cars. At about the same time, aluminum drums were adopted to some extent for formaldehyde.

This earlier type of drum, known to the chemical trade as ICC42B, was made in what seemed to be the logical pattern, two flat heads and a cylindrical body. The edge of the head was beaded onto a chime ring of elliptical section and then welded to the cylindrical shell. A ring of angle section was welded on to protect the joint. Two or more rolling hoops were fastened on the outside.

This type seemed perfectly satisfactory for any uses then contemplated. The drum was light, resisted corrosion, and passed the four foot drop test of the Interstate Commerce Commission. This drum was invariably made with a ¼ in. wall which, of course, called for the use of so much metal that the cost was prohibitive for other than special uses. However, aluminum drums have assumed a permanent position as a medium for shipping commercial acetic acid.

It was a known fact, however, that aluminum exhibited a marked indifference to the action of a much stronger acid—nitric—provided that the concentration of the acid was greater than 80 per cent. This apparent paradox is due to the comparative insolubility of the oxide at first formed in the more concentrated acid. On the other hand, with any concentration

greater than 70 per cent., all risk of leakage or breakage must be positively prevented. Aluminum drums would effectively prevent breakage, but unfortunately the weld was hidden in a crevice at the juncture of the wall and the head in a spot where leaks (sprung by accidental damage) would be most difficult to repair.

These facts pointed to one conclusion. Why not move the joint between the head and wall away from the end of the drum?

In one design, the seam was moved clear to the center of the drum by welding two drawn half shells together at their circumference. In another type, the circumferential weld was moved only part way—in other words—two spun heads about 6 in. deep were welded on to a cylindrical shell, which in turn was welded along its length. By both methods the weld is more accessible to inspection, and more likely to result in a good seal.

The new type of drum proved even stronger than its predecessor. It was lower in price in that it was lighter and easier to fabricate. Not only did it pass the standard four foot drop test when filled to capacity, but repeated 20-ft. drops on one head edge did not cause the leakage of a drop of contents. The test showed in striking fashion the toughness and flexibility of aluminum, for the corner receiving the impact was badly crushed at the weld. Still the drum did not leak.

No container intended for a strong acid is complete without a good closure. The usual drum bung is a threaded plug. If the threads in the drum become stripped or damaged, the entire container must be returned for repair. This has been eliminated in the aluminum drum by a device that is ingenious in its simplicity. The opening in the drum is threaded, as usual, and a bushing with a second set of inside threads is screwed in. These threads receive the plug itself which has a projecting edge to bear on a washer. In case the inner threads become damaged, only the bushing need be replaced.

The bar to the shipment of commercial nitric acid in concentrations of 80 per cent. or more has been imposed because of the danger of breakage or leakage. A break-proof, leak-proof container offers a means of obviating the necessity of shipping 30 lbs. of water with every 70 lbs. of acid. The habits of an industry are hard to change, but this new development does present some interesting possibilities in transporting a hazardous material.

Closely paralleled with the development of a drum for nitric acid is that of a drum for hydrogen peroxide. However, hydrogen peroxide is not classified as a dangerous chemical; the reason for shipping it in aluminum is not external but internal. Aluminum is one of the few metals which will not decompose hydrogen peroxide catalytically. Since hydrogen peroxide is not a particularly hazardous material, a lighter walled drum can be used. The possibility of still further lightening this drum without sacrificing strength is made possible by the use of an alloy stronger than pure aluminum. Furthermore, the bushing in the bung must not come in contact with the liquid. For this reason the opening in a peroxide drum is drawn out into a short tube and threaded on the outside. The bushing is then screwed on and on the outside of it a threaded cap with a washer is applied.

Aluminum drums for acetic acid were followed by aluminum tank cars; but in the case of peroxide, the tank cars preceded the drums. The growing importance of hydrogen peroxide as a bleach led to the development of a means for shipping the 30 per cent. solution in car lots, but until the special design of the peroxide drum was worked out, carboys of dark glass continued to be the standard shipping container for smaller quantities.

If a new drum is suitable for a strong acid on the one hand, and for a decomposable liquid on the other, what can bar its use for a multitude of comparatively inactive products? The higher first cost might be such a bar, were it not that first cost is a negligible item with a well made returnable drum. Some of the things that higher first cost pays for in the case of aluminum are: long life, resulting from resistance both to external and internal corrosion and from its ability to absorb shocks without fracture; efficient design, making possible the easy detection of leakers and the complete removal of the contents; and finally light weight, which by making handling easier and return shipment cheaper, will alone suffice to pay back the difference in cost. Aluminum drums are available in three wall thicknesses—heavy, medium and light. The first is designed for the more dangerous chemicals, the second is for those less dangerous, and the last is for materials with which light weight can be made the primary consideration. In the various types are other minor variations, such as the design of the rolling hoops, which may be either aluminum or steel; the exact manner of dishing in the bottom of the drum; all of which are optional and have little to do with the usefulness of the drum.

The Industry's Bookshelf

Bacteriology and Sanitary Science, by Louis Gershenfeld, 493 p., published by Lea and Febiger, Washington Square, Philadelphia, Pa. $4.50.

This book is for the pharmacist, the chemist, the nurse and all other public health workers. It supplies the knowledge of bacteriology and sanitary science, without which they cannot cooperate intelligently with the physicians and health agencies. It is to these workers, rather than to the physician, that the layman most frequently turns for information on sterilization, disinfection, fumigation, disinfectants, insecticides, deodorants and on all general questions covering sanitation. Public health is no longer the exclusive concern of the physician. The work supplies the essential understanding of the everyday problems. It will qualify the student to disseminate reliable data, to prepare staining solutions, culture media, etc., and it will give him that knowledge of the manufacture and use of biological products which is so essential to their preservation and sale.

The Costs of Industrial Research

A summary of the preparation of cost estimates, the research budget, and comparison of actual cost with the budget abstracted from a brief prepared by the Policyholders Service Bureau of the Metropolitan Life.

MOST companies that prepare estimates of the costs to be incurred in research on a problem make the estimate at the time the project is approved or before starting work on it. First, an estimate of the cost of the project is required before its authorization; second, the estimate is prepared to control expenditures as the work progresses. When the project budgets are tied into the department budget, the estimates are all prepared at the time that the budget for the department is prepared and approved. Generally, a supplemental allowance is added to the departmental budget to take care of projects that will be authorized before the commencement of the next budget period.

Many companies prepare their estimates for research projects in detail both as to cost involved and the probable amount of time necessary for completion. All labor and material costs are carefully estimated and the overhead of the research department applied to the other costs. Through a comparison of these estimates with actual cost, some degree of control can be exercised over the research expenditures.

The research laboratories of a certain food products company prepare cost and time estimates in detail for each new project. These are prepared by a worker assigned to the job, in collaboration with the chief engineer and director of research. Items of labor, material and supplies are considered individually and collectively, and to these costs a percentage for the department's overhead is added. All estimates for major projects must be approved by the executives of the company and included in the departmental budget before work can be started.

In companies that prepare cost estimates for each project, the estimates do not always go into details of labor, material, and overhead. In some, labor alone is considered; in others, labor and materials; whereas others only estimate the material and equipment costs. Many organizations consider the expense of the research department as plant or organization overhead and no estimates are made for the overhead of the research department itself. In several companies estimates of labor and material only are prepared for each new problem of the technical department. Overhead is not considered on each individual problem.

Several companies consulted in making this study stated that the preparation of estimates of research projects is hardly practicable, but twenty-three out of the forty-five companies reporting prepare cost estimates for each project. Twelve prepare their estimates in terms of labor, material and overhead; five in terms of labor and materials cost only; and six lump all their costs into one figure. Of the nineteen that do not prepare estimates on all projects, several prepare estimates for the larger and more extensive problems.

The "Production Development Summary," shown in Figures 1 and 2, illustrates the method used by one manufacturing company in authorizing development work and in estimating its cost. Estimates are prepared under these three heads: cost of experimental engineering, cost of producing a satisfactory model, and cost of materials for use in the model. On the basis of these, the development allowances for the project are determined and recorded on the same form. Estimates are also prepared for the anticipated manufacturing cost of the product after its development has been completed.

Departmental budgets have been developed by many companies to establish control over research activities, in which the limits of expense have been set and methods devised for comparing the actual expenditures with the budget allowances.

In some organizations the research budget is determined in connection with the anticipated sales of the company during the budget period under consideration. In others, a fixed percentage of past sales is used as a research budget, while some are guided by a percentage of expected sales in setting up the research budget.

The methods of budgeting in use, however, show considerable variation. Some organizations prepare the budget in great detail for each of the projects to be undertaken. Others fix the budget as a lump sum to cover labor, materials and supply expenditures and it

is used primarily as a guide to assist in keeping expenses within bounds. The method used will depend upon the financial requirements and the extent of the research work performed.

The research laboratories of a building materials company are operated on the basis of a budget that is reviewed quarterly. The various factors considered in determining the allowable expense for research and development are as follows:

1. The program, both immediate and long range, is reviewed by the research and development committee composed of representatives of the various chief executives of the organization.
2. The program is divided into the various main lines of products known as commodity groups in which the company's business lies. Each commodity group is first considered separately by the committee.
3. Manager of the research laboratories recommends the budget and organization necessary to carry out the various programs considered desirable by the committee.
4. The committee then reviews the budget, organization, and program as a whole with the following factors considered:
   (a) Concentration of efforts to obtain practical results, avoiding a program of too much diversification.
   (b) Consideration of percentage of total budget to sales.
   (c) Consideration of emphasis placed in the program on each commodity group as compared to sales and profit of each group.

The necessity for flexibility in the research budget is perhaps more pronounced than for any other division of an organization. The requirements of an industry may often dictate necessary developments that were not included in the original budget program. When such conditions arise, it becomes necessary to increase the budget allowances for research to the extent demanded by new developments.

- Suggested New Product -

Name of Product_____
Description_____
Advantages of this Article_____
Sales Survey by Sales Dept._____

- Form To Suit Sales Dept. -

Consisting of:-

A- Similar Products - If any -
B- What are Their Sales -
C- What are Their Selling Prices -
D- Estimate of Possible Sales -
E- Our Selling Price -
F- Our Cost -

Authorization to Engineering Department to proceed with preliminary drawings. Preliminary Estimate of Article, Tools, and Engineering based on quantities of _____The foregoing-approved by_____

Amount authorized for initial expenditure covering the above not to exceed _____

(In case of emergency, Sales Department may wish to omit this)

Approved by _____
Engineering Department

Sales Cost First Year _____
Estimated Cost of 1st. Year's Production _____
Total - - _____

Estimated Gross Sales 1st. Year- _____
Profit- - _____

Approved by _____ Approved by _____
Sales Department Management

Figure 1. Production Development Summary.

Experimental Preliminary Engineering Data:

Name of Product _____
Estimated Cost of Experimental Engineering _____
Estimated Cost of Producing Satisfactory Model _____
Estimated Cost of Material, Patterns, Etc., for Exp. Model _____

PRODUCTION COSTS

Estimated Production Cost of Article _____
Estimated Production Cost of Engineering _____
Estimated Cost of Tools - - - - - - _____

Total - _____

Reserved for Engineering Dept. Data only -

Cost to Produce Preliminary Drawings: _____
Cost to Estimate Production Cost of Article _____
Cost to Estimate Tool Cost - - - - - _____

Total - _____

Figure 2. Production Development.

This flexibility appears in the budget programs of many companies. A paper company, for example, prepares a budget for its research department that takes into consideration the effectiveness of the work performed and the possible need of adding to the budget when problems that seem to warrant such additional expenditures arise. Similarly, the annual research budget of a certain food products company is set up to maintain the projects in force at the beginning of the year. Additions are made in the event of new projects being approved.

The research and development department of a chemical company is operated on a budget set by the executive committee of the company on a basis of normal operation. Extraordinary expenses for plant development are covered by special appropriations on estimates furnished by the research department, approved by the manager of the company, and forwarded for final approval to the executive committee. Such appropriations are in addition to the sum fixed for ordinary activities.

Although many companies do not use a formal budget program in controlling expenditures of their research departments, the procedure in use closely resembles budgetary control. In some instances, the department is allowed a standard or normal expense, appropriations being made by the administrative head of the company for abnormal expenditures. In other cases executive approval is required for each research problem undertaken, the approval being based on a cost estimate submitted by the research director or research committee.

In one plant, allowable expense for research and development is determined by board action when demands exceed a normal amount. A building materials plant periodically grants a certain basic allowance for research work. When problems that give promise of successful completion are developed, the needed funds are granted to carry this work through the development stages to production and sale.

An informal budget procedure is used for the research departments of a company producing metals

and metal compounds. The research expenditures for any year are determined by (a) the precedent furnished by the preceding year (as, for example, personnel employed, plant available and problems pending) and (b) the exigencies of the year in question, including an informal forecast at the commencement of the year of what is likely to be required during that year.

Budgetary control is often exercised over individual projects undertaken by the research department as well as for the department as a whole. While a few companies that use the project budgetary control method do not use the departmental budget, the majority using the project method also prepare a budget for the department as a whole. In some instances this is made from a summary of the individual project budgets.

Although only twenty-three of the forty-five companies cooperating in this study make estimates of the costs incidental to the conduct of a research project, thirty-five accumulate the actual costs of carrying on these projects. Twenty of these companies accumulate their costs in detail, taking the actual labor and material costs expended on each project, and allocating the overhead costs of the research department. Nine additional companies accumulate labor and material costs only, while four others collect cost information for labor only. Of the ten not collecting costs for all projects, six accumulate their labor and material costs on the larger and more extensive projects.

Project costs accumulated in the research department usually are prepared in one of two forms, either on the research department office copy of the order authorizing the undertaking of research or on a special cost report made out for each project.

PROJECT RECORD FORM

Requested by:_____ Approved by:_____

Accounting Group:_____

DESCRIPTIVE SPECIFICATIONS

Estimated Cost_____ Estimated Finished Date_____

PRELIMINARY SURVEYS

	Assigned To	Estimated Date	Revised Date	Complete
Technical & Experimental Field & Competitors' Equip. Sales & Market				

Executive Approval for Continuance_____ Date_____

DEVELOPMENT PROGRAM

	Assigned To	Estimated Date	Revised Date	Complete
Experimental Procedure Tests - Reports Production Design Cost Estimates Samples Ratings Final Page, & Specifications				

Executive Action Date_____

Delivered to Manufacturing Department_____ Approved by:_____

Follow-up Assigned To_____

Figure 3. Project Record Form.

ENGINEERING DEPARTMENT

DAILY TIME MEMORANDUM SLIP

NAME_____ DATE_____

ORDER NUMBER	TIME

REMARKS

SIGNED_____

Figure 4. Form used by instrument manufacturing company.

One manufacturing company uses a cost record shown for accumulating the cost data on the various projects. Labor is recorded daily on this record through the medium of time tickets made out by each research worker and collected in the chief engineer's office. Material is charged to each job order monthly as taken from stock and purchase requisitions. An overhead charge is placed against the department and distributed to each project as a percentage of labor hours. This record provides for the proper recording of the time of as many as five staff members working on a project. Three columns for each staff member have been provided for three months' entries. The second and third columns in each group may be utilized by entering the month at the top of the column. In the event that a project is not completed within that time, a second column is started with the staff member's name heading it, since it is seldom found necessary to use all five columns at once.

An engineering company reports that it accumulates research costs against each project for the eleven items shown on the project record form Figure 3. All employees of the research corporation, with the exception of executives, clerks and stenographers, report the time spent on each project. All material purchases are charged to specific projects. Material and labor furnished by affiliated companies are charged to the projects at cost plus an amount representing the overhead of the affiliated companies chargeable to the work performed. This record form gives a concise history of the entire development from its inception, and includes budgeted figures, actual cost, scheduled program and general specifications.

In addition, individual orders for each of the various steps in the development of the project are issued. Material and labor costs for each step are collected separately so that it is possible to determine not only the total cost but the cost of each step. The general overhead of the research corporation is applied as a percentage of the time directly charged to each project.

Labor costs are usually accumulated for research projects in one of two ways—either for a specified project or for a specified period of time, such as the day, week, or month. These costs are accumulated periodically and charged to the projects upon which work was performed.

The type of time card used in reporting labor costs depends largely upon the amount of time devoted to a research project. Those organizations whose projects are worked on intermittently over a considerable period of time generally prefer project time cards covering a period of a week or month. These forms usually have several columns, one for each project. The time spent is entered in the proper project column opposite the date when the work was done. When the research worker can perform several jobs in one day the daily time card is often used.

Figure 4 illustrates the daily time card used by a company manufacturing instruments. Each man in the research department, except the department head, records on one of these slips the projects on which he worked each day and the amount of time spent on each. They are collected daily, reviewed by the engineering department and forwarded to the cost department.

A food products corporation uses two types of time cards in its research organization, one for laboratory workers and one for machine shop workers. The laboratory workers' slips are made out daily and show projects worked on and the amount of time devoted to each; the machine shop time slips are turned in weekly and contain the same type of information.

In some cases formal time cards are not used. For example, in one company the research workers report verbally to the research department's cost clerk the number of projects worked on each day and the amount of time spent on each. In another, the treasurer's department obtains the daily time records for each project from the diaries of the engineers, draftsmen and research workers.

Although most of the companies contacted in this study accumulate the labor cost for each project from the time cards of research employees, this time is not broken down into types of work performed. Several, however, obtain their labor costs in detail as to the nature of the work performed by each employee. One uses a daily time card on which the employee records the amount of time spent on each project divided into the following elements: designing, setting up apparatus, running tests, writing reports, and supervision grouped according to whether the time was spent inside or outside of the factory. Traveling expense is recorded as a separate item.

Research department material costs are accumulated and treated in a manner closely resembling that used for the manufacturing department. Factory department material costs are generally classified as direct (those allocated directly to a particular job or product) and indirect costs (those included in the departmental and plant overhead).

The regular run of laboratory and research department supplies are not charged directly to particular research projects but are included in the departmental overhead since they are used on various projects. Special materials and equipment, purchased for a specific project are charged directly to that project. In some research departments where material costs are a small fraction of the total research expense, all materials are treated as overhead.

Materials charged directly to a project are generally handled on a requisition basis. A requisition is issued for the materials and the project number placed on it. These are sent to the accounting department or given to the accountant in the research department who charges the costs to the research project. Materials requisitions used by the research departments are generally in the same form as those used throughout the manufacturing units.

Costs other than those for research labor and material, such as construction and erection of equipment, manufacture of tools and castings, testing on a commercial basis, and other types of work performed in departments outside the research department and having the equipment and personnel adapted to such work, constitute research expense. As such they usually are accumulated and charged to definite research projects.

In most companies the same form is used in purchasing material and labor from outside concerns for the research department as is used by the manufacturing departments. Machine parts or materials may also be ordered from other factories or departments of the company and the form used for that purpose by the manufacturing department would be used. These internal or external purchases are costed, the proper plant overhead applied, and the total charged to the particular research project for which they were purchased.

Research overhead is treated in much the same manner as overhead in a manufacturing unit. In some companies having several research divisions, overhead properly chargeable to a section is so charged. The remaining general overhead is apportioned to all sections on an empirical basis. In others the overhead of the research department is not split up by divisions but apportioned directly to the projects upon which work was performed in the department.

Research overhead is generally distributed to the projects on a basis of labor hours or labor cost. In some instances, it is prorated to the projects as a percentage of total labor and material costs. An engineering and a chemical company both distribute overhead to each project on the basis of the man hours spent on that project. A large agricultural products company distributes overhead on the basis of the dollar costs of the project.

In a certain food products company, research and development projects are reviewed at frequent intervals, usually monthly, by a research committee consisting of the research manager, the assistant general superintendent, the general chemist, and the superintendent of the research laboratory. This committee does not authorize funds for certain expenditures but acts in an advisory capacity only. After consultation with the committee, the research manager authorizes the continuance or cancellation of the project.

Trade Names in Chemical Fields

MANY products in use many years are marketed under names which are not chemically descriptive. Because of constant use these trade names have become so familiar that the chemist immediately associates the name with some chemical characteristics. In most cases the chemical characteristics are of no moment for they are used solely because of their physical characteristics. In many cases some chemists do not even know the chemical combinations present—in some cases there is a variance of opinion.

The list following indicates but a few of these products: Glue, Casein, Albumen, Mineral Oil, Asphalt, Tar, Rosin Oil, Red Oil, Stearin Pitch, Dextrin, Bone Black, Degras, Montan Wax, and hundreds of others could be given but lack of space precludes this.

The use of trade names for chemical specialties has prevailed abroad for many years. The last few years have seen a tremendous increase in their use in this country for the designation of divers chemical compounds. It is far simpler to coin a trade or descriptive name for a heterogeneous or complex chemical product than to give a long chemical description of it, which, in some cases may not be completely correct.

For example, instead of referring to a product as a complex phenol-formaldehyde condensation product how much simpler and euphonious is the term "Bakelite". Isn't it easier to think of a "Glyptal" rather than glycerol phthallic anhydride fatty acid condensation product? Why say monoethylether of ethylene glycol, when "Cellosolve" can be used? Isn't it easier to refer to a product as Turkey Red Oil A rather than to a soda neutralized sulfonated castor oil of a definite degree of fat and sulfonation?

The genesis of such trade name nomenclature by manufacturers of specialty chemical products is not founded on their selfishness as has been imputed by some in the past.

Most manufacturers spend much time and money in developing new products and finding uses for them. Because of the vagaries of our patent system and because some products are not patentable, a manufacturer is hard put to devise ways and means to protect the products of his ingenuity and labor. Without some measure of such protection, what incentive is there for him to continue his efforts? Isn't the "big bad wolf" of cheap competition always on the lookout to steal the fruits of his labor and undersell him? This is continually going on, as it is.

How many competitors analyze products and succeed in duplicating them? If this process is not lengthy then the expense involved is little and the product is ready, without any research, development or initial sales cost.

When the composition of a product is benignly disclosed by a manufacturer some unscrupulous competitors start turning out a lower grade material at once and begin cutting prices to the detriment of the pioneering maker and of the consumer, who only gets what he pays for. The latter seldom knows that he is not getting what he has asked for and only finds out by the costly trial and error method. Eventually of course specifications are laid down, but in the meanwhile much damage has been done and mistrust has been sown in the mind of the purchaser. A specific case is the chaos which existed in buying sulfonated oils until an association of sulfonated oil manufacturers was organized. Prior to this sulfonated oils were subject to all sorts of sophistication by some manufacturers and dealers. This subjected the honest manufacturer to "cut-throat" competition of the deadliest sort.

A fallacious argument sometimes heard against the use of trade names is that since the product in question is only obtainable from one manufacturer then the consumer may be placed in jeopardy by the maker raising prices at will. Also that if the manufacturer should go out of business, the product would be unobtainable. While a "trade name" product is only made by one manufacturer, it is extremely unlikely that no other materials are on the market that can replace it. If prices are advanced inordinately, sales will fall off as substitutes begin to appear. The same reasoning applies to the possible failure of the manufacturer to continue in business and supplying this product. If the product fills a useful need similar products will be found to replace it.

Some chemists state on the one hand that they will not use a product whose composition is unknown to them. On the other hand they use such complex and variable materials as Ponceau 2R Nigrosin, Turkey Red Oil, etc., no two lots of which may be exactly the

same. As a rule a manufacturer or dealer supplies whatever physical or chemical characteristics are needed to apply his product in various commercial uses. The fact that a chemist may not know the composition of a material is often a blessing in disguise (except in syntheses) in that he may attack his problem entirely free from any preconceived ideas both conscious and subconscious. Having tried a similar chemical product without success, he may form a preconceived notion that this, too, will be unsuccessful. This preconception, too often, is a major cause of a hasty rejection of material which if treated as an unknown may fit in or disclose a long wanted or overlooked trail.

The greatest opposition to the use of trade names has come from the chemist. From a psychological standpoint, his position is correct. The chemist abhors an unknown and instinctively trys to "find out" its composition and properties. In the case of chemical synthesis, it is essential that he know the chemical composition of all materials with which he is working. But few of our chemists are engaged in synthesis. By and large the great majority of our chemists are engaged in compounding.

For example the lacquer chemist is merely making a complicated solution of pyroxylin in solvents along with a plasticizer and pigments or colors. Little if any chemical reaction occurs between the components of the mixture. Similarly the textile chemist who uses detergents, sizes, etc., is not often concerned with chemical reactions of the materials he uses. Of course it is not here intended to convey the impression that pH has no bearing or that incompatible materials may be used or that chemical control is unnecessary. The point that the writer is trying to make is that most processes where chemicals are used have but one end in view—*i. e.*, to get a definite physical result and not a definite chemical product.

Thus if cloth is to be waterproofed to certain specifications, it matters not what chemicals are used provided that the finished cloth meets the specifications. If leather is to be made of a certain flexibility, durability, and color these physical properties are the result sought. Similarly in an alloy, the properties desired may be certain degrees of hardness, tensile strength, ductility or density—purely physical characteristics. So in rubber compounding we may seek for elasticity, tensile strength, durability, and appearance. In foods we may look for flavor, color, digestibility, food value, etc. In cosmetics the desideratum might be odor, appearance, utility, and sales appeal. In paints a durable, colorful appropriate finish may be desired. In all these cases we use chemical products to obtain certain physical properties.

The non-research chemist in industry is usually working under great pressure. In addition to routine work he must assist in developing new products, improve old ones and act in the capacity of "trouble-shooter" in emergencies. When a problem must be solved in a hurry, he often cannot stop to analyze a commercial product and synthesize a similar one—life is too short and the sales department is howling for action. This can often be gotten only by resorting to a commercial trade-marked product.

Thus if a coating or finish is desired, which will have certain physical properties, isn't it far easier to look through the catalogs of commercial products, select the proper resin and solvents, e.g., cumar and toluol, make the necessary adaptations, than attempt to build a new resin, solvent, etc.? By doing this, the chemist applies, to his advantage, the results of much work and experience of the manufacturer of resins, solvents, etc.

Similarly if a rubber chemist needs an anti-oxidant, for a special purpose, in a hurry, does he cloister himself in the research laboratories for months, and expect his firm's customers to wait? Nay, nay! He consults the literature of the manufacturers of anti-oxidants and selects Age Rite White, Antox, Stabilite or VGB and with suitable variations "licks his problem" in short order.

If a cosmetic chemist is told that he must duplicate a competitive cream by 10 A. M. the next day he is placed in a rather tight situation, to say the least. But if he can go to his catalog file and find a number of formulae using Deramin or Xerol or another proprietary product to produce a cream having physical properties similar to those desired he stands a good chance of having a smile on his face at 10 A. M. the next day. The common usage of trade names is best illustrated by the listings which follow for some important industries.

Paints & Varnishes: Bakelite X R 3360, Glyptal #1203, Amberol B/SI.

Textiles: Monopole Oil, Velvo-Ray, Igepon, Gardinol, Alkanol M 48.

Pigments: Titanox C, Lemon Yellow Timonox, Lithopone, Peerless Black.

Rubber: Captax, Kalite #1, Zimate, Anti-Scorch T, Neozone A.

Abrasives & Fillers: Silex, Celite, Volclay, Schultz Silica, Asbestine.

Gums: Lupogum, Galagu, Gum #222, Gum Tragasol.

Aromatics & Flavors: Gingerine, Clovel, Rosodor, Vanarome.

Cosmetics: Wyrol, Ceraflux, Aquafil, Tegin, Hydristear.

Solvents: Petrohol, Cellosolve, Pentasol, Ansol, Glycopon.

Waxes: I. G. Wax, Opal Wax, Glyco Wax, Lanette Wax.

Preservatives & Antiseptics: Nipagen, Moldex, H. T. H., Preservaline, Lysol.

Plastics & Synthetic Fibres: Celluloid, Fiberloid, Celanese, Rayon.

Dyestuffs: Naphthol Yellow S, Sudan II, Fast Red A, Direct Yellow R.

Testing Wax Molding Compounds

By George I. Cooper

THERE are several types of prepared wax molding compounds now available. In addition many electrotypers buy various waxes to blend their own molding wax. Every electrotyper has his own preference as to molding wax and the problem is not one of choice of wax formula, but of maintaining the best physical properties in the formula selected. The information given below, therefore, should not be taken as applying only to the formulas and conditions cited. It is applicable to all electrotyper's molding waxes and if the broad principles which are indicated are used to standardize and control whatever wax is being used the writer is certain that some difficulties with molding wax will be minimized.

The wax formula chosen as a starting point was as follows:

FORMULA 1

100 lbs. ozokerite (Pure Hard Green-Austrian)
20 lbs. pitch
10 lbs. beeswax

Measuring the Hardness

One of the many types of hardness measuring devices in common use, the penetrometer, seemed the most logical and convenient for measuring the hardness of electrotyper's molding wax. For our experiments a Dow penetrometer was selected. This instrument measures the depth of penetration of a standard size needle, in a thick film of the wax being tested, when the needle is under a definite pressure and for a definite length of time at a definite temperature. The instrument scale indicates the depth of penetration of the needle into the wax in 0.1 mm. units. It was found that the same needle that is used for testing asphalt is satisfactory for testing electrotyper's molding wax. The needle is subjected to a load of 150 grams for a period of 15 seconds. The test is carried out at temperatures of 77° F. (25° C.) and 95° F. (35° C.) the temperature being maintained by means of a water bath which is furnished as standard equipment with the instrument. The latter temperature is approximately that used during the molding operation.

A number of molding waxes were tested under the above conditions and the results of the tests checked very well with the results of previous investigations.[1] It was found that when tested with a standard needle and a weight of 150 grams for 15 seconds, the hardness of several satisfactory molding waxes at 77° F. (25° C.) ranged from 26 to 32 (i.e., 2.6 to 3.2 mm. penetration). Even more significant was the ratio between the hardness at 95° F. (35° C.) and at 77° F. (25° C.). The ratio for waxes that molded satisfactorily was found to be about 2.2. A table showing some typical results obtained with Formula 1 tested over a period of time is given below.

Formula No. 1 Sample No.	*Hardness at 77° F*	*15 Seconds Penetration at 95° F*	*Ratio $\frac{95°F}{77°F}$*	*Date*
1	34	74	2.17	12/23/26
2	36	79	2.19	12/29/26
3	29	65	2.24	1/ 4/27
4	33	72	2.18	1/11/27
5	32	73	2.28	1/18/27
6	33	75	2.27	1/25/27
7	32	75	2.34	2/ 1/27
8	32	69	2.16	2/ 8/27
9	37	77	2.08	3/15/27
10	36	78	2.16	2/22/27

A wax which gave very satisfactory results at first soon became hard, brittle and unsatisfactory due to loss of volatile matter during remelting. Forty lbs. of steam or a temperature of 266° F. was being used to heat the wax in the remelting kettles. A reduction in the steam pressure to 20 lbs. (228° F.) reduced the rate of hardening tremendously, at the same time not interfering with the case making operation. By reducing the temperature at which the wax is remelted a long step is taken towards elimination of hardening and embrittling of the molding wax. The usable life of the wax is thereby increased many-fold.

In spite of these precautions it will be found that a batch of molding wax will gradually become harder, and periodic penetrometer tests made regularly will indicate the degree of this increasing hardness. Using Formula 1 as given above it was found that due to mechanical loss of wax in process it was necessary to add 5-10 lbs. of replacement waxes per week, con-

sisting of ozokerite, pitch and beeswax, in the same proportion as Formula 1. This replacement wax softened the entire batch of wax sufficiently so that it was only necessary to add a very small amount of vaseline which was found to be an excellent softening agent. One pound of vaseline will usually soften the wax satisfactorily. Over a period of 20 days, with a temperature in the remelting kettles of 20 lbs. of steam (228° F.), the wax hardened only very slightly and was softened by the addition of 5-10 lbs. of a mixture of ozokerite, pitch and beeswax in the same proportions as the original wax Formula No. 1. The use of vaseline in small amounts in combination with replacement waxes in the same proportions as Formula 1 will make it possible to accurately control the hardness of the wax.

Periodically, regardless of precautions taken, it will be of advantage to discard the entire batch of wax and use a fresh one. A change once a year is a good policy to follow. However, it is to advantage to make a new batch of wax if serious difficulties causing poor results are encountered before this period has elapsed. Graphite is very frequently added to the wax to start with. It also becomes incorporated with the wax during the graphiting operation even though not added intentionally. It tends to make the wax slightly harder and more brittle, at the same time reducing stickiness.

The effect of addition of candellila wax to electrotyper's molding wax was studied. The object of adding this is to obtain a smoother and harder wax. It was found that the addition of 10 per cent. of candellila wax to Formula 1 considerably improves the smoothness of the wax with only a slight increase in hardness.

Tint blocks made from the regular Formula 1 and Formula 1 after the addition of 10 per cent. of candellila wax show that the addition of candellila wax gives a much smoother tint block. Obviously the same is true on all wax molds where candellila wax has been incorporated with Formula 1. Some hardness tests made on wax Formula 1 show the effect of adding five and 10 per cent. of candellila wax.

HARDNESS—5 seconds penetration

Sample	*at 77°F*	*at 95°F*
(1) Formula 1	11	26
	12	25
	12	23
	12	25
	12	26
(2) Formula 1	13	26
plus 5 per cent.	13	24
Candellila	13	24
Wax	12	24
	13	24
(3) Formula 1	12	24
plus 10 per cent.	12½	26
Candellila	12	24
Wax	12½	24
	12	24

Plasticity tests can be made with a Rockwell Hardness Testing Machine. By means of this instrument the rate at which the molding wax flows under standard conditions of temperature and pressure can be noted. It was found that to mold an average wax mold consisting of type requires a pressure of one-half to one ton per square inch when the wax is in good condition. Obviously the plasticity test can be used along with the hardness test to standardize and control electrotyper's molding wax.

Some typical plasticity tests made with this instrument were as follows:

ROCKWELL PLASTICITY TESTS

Made at 77° F—Major Load—150 kilograms
Minor Load— 10 "
Area of Point—0.15 Sq. In.

	Major Load	*Minor Load*
Wax on Case	238	212
(New-Soft)	237	210
Wax on Case	231	183
(Old-Hard)	230	182
	232	183
Sample—Another Foundry	238	228
	238	226
	235	222
Candellila Wax	215	148
	211	159
Beeswax	270	270
	265	265
Dept. 10 Wax &	235	175
15 per cent. Candellila Wax	235	175

[1]Dr. H. D. Holler's unpublished experiments made in 1916 at the Bureau of Standards.

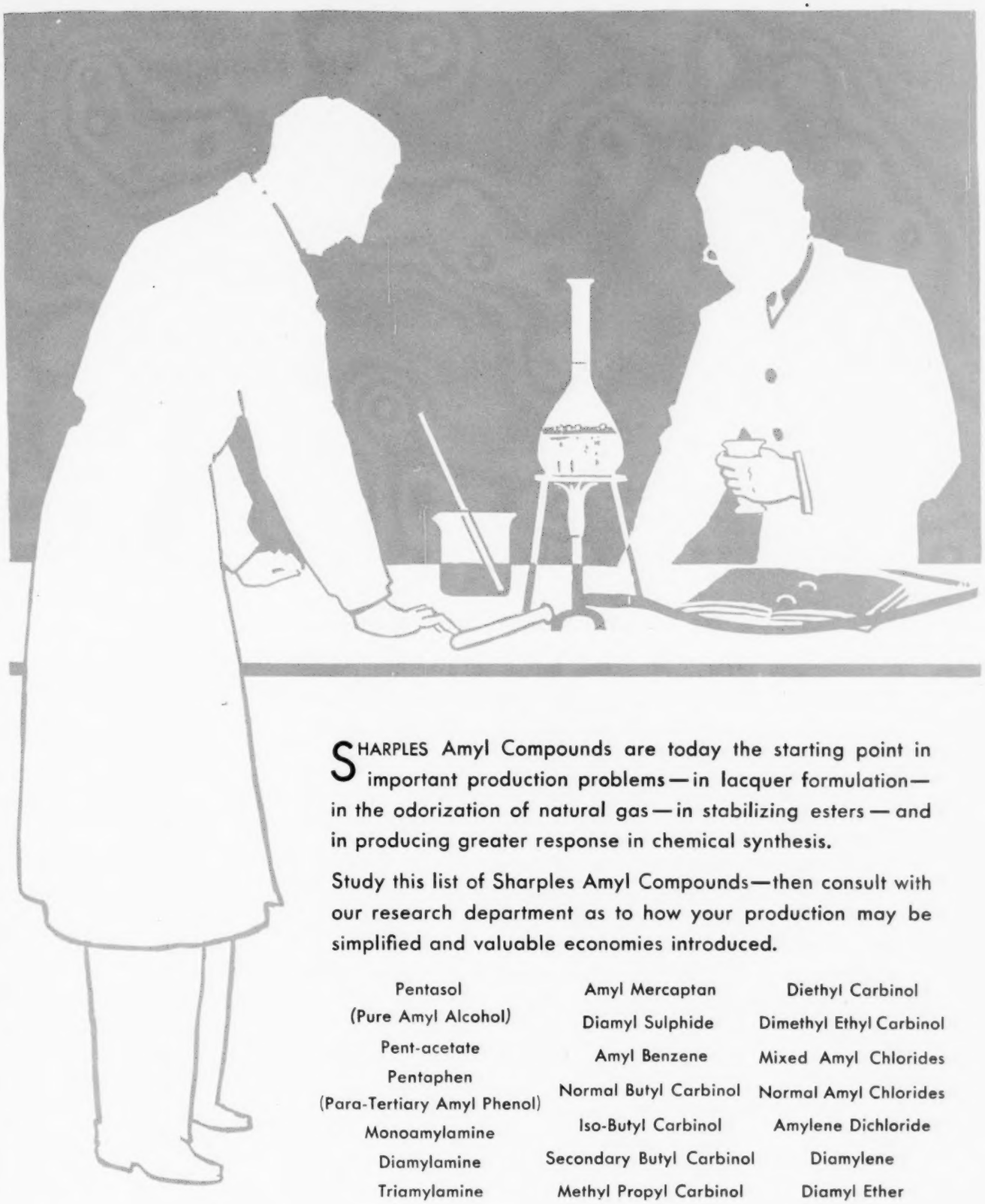
The Industry's Bookshelf

William Guggenheim, by Gatenby Williams, 156 pages. The Lone Voice Publishing Company, 3 Riverside Drive, New York City. $2.50.

This book undoubtedly would never have been published had not Mr. Guggenheim been proud of his career—he has reason to be—and at this time when business leaders are so generally out of favor and so often discredited, it is a valuable antidote to have a record of so constructive a career. Tradition in chemical circles has it that the foundations of the Guggenheim family fortune were laid by Rye, the famous American Brand which was sold to the Pennsylvania Salt Company for a price sufficiently to supply a nest egg of working capital which was hatched out into such a flock of golden-egg-laying enterprises and chemical readers will wish that the origin of the family had been treated more in detail, for its interesting chemical connections.

Money Changers vs The New Deal, by Harry Elmer Barnes. 150 pages. Ray Long & Richard R. Smith, Inc., 79 Madison Ave., New York City. $1.00.

The best case for inflation yet presented. Author while decidedly pro-Rooseveltian in money matters has presented the facts on both sides of the question with admirable impartiality. It is written in clear and easily understandable language entirely divorced from the mysteriousness with which so many of our orthodox economists feel it necessary to cloak financial studies. Author insists that the purchasing power of the masses must be increased and urges a wider distribution of the profits of industry. Only criticism of the Roosevelt money policies to date is that inflationary measures have not been sufficiently aggressive.



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Pentaphen
(Para-Tertiary Amyl Phenol)
Monoamylamine
Diamylamine
Triamylamine

Amyl Mercaptan
Diamyl Sulphide
Amyl Benzene
Normal Butyl Carbinol
Iso-Butyl Carbinol
Secondary Butyl Carbinol
Methyl Propyl Carbinol

Diethyl Carbinol
Dimethyl Ethyl Carbinol
Mixed Amyl Chlorides
Normal Amyl Chlorides
Amylene Dichloride
Diamylene
Diamyl Ether

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CHEMICAL

The Photographic Record

Five leaders of Italian chemical industry which has grown rapidly under the Fascist regime. Left, Hon. Senatore Prince Ginori Conti, of the Larderello Works; right, Dr. Piero Feretti, President, Societe An. "Ledoga" e Consociate.

Comm. Gerolamo Gaslini, Administrator Delegate della Gaslini, S.A.

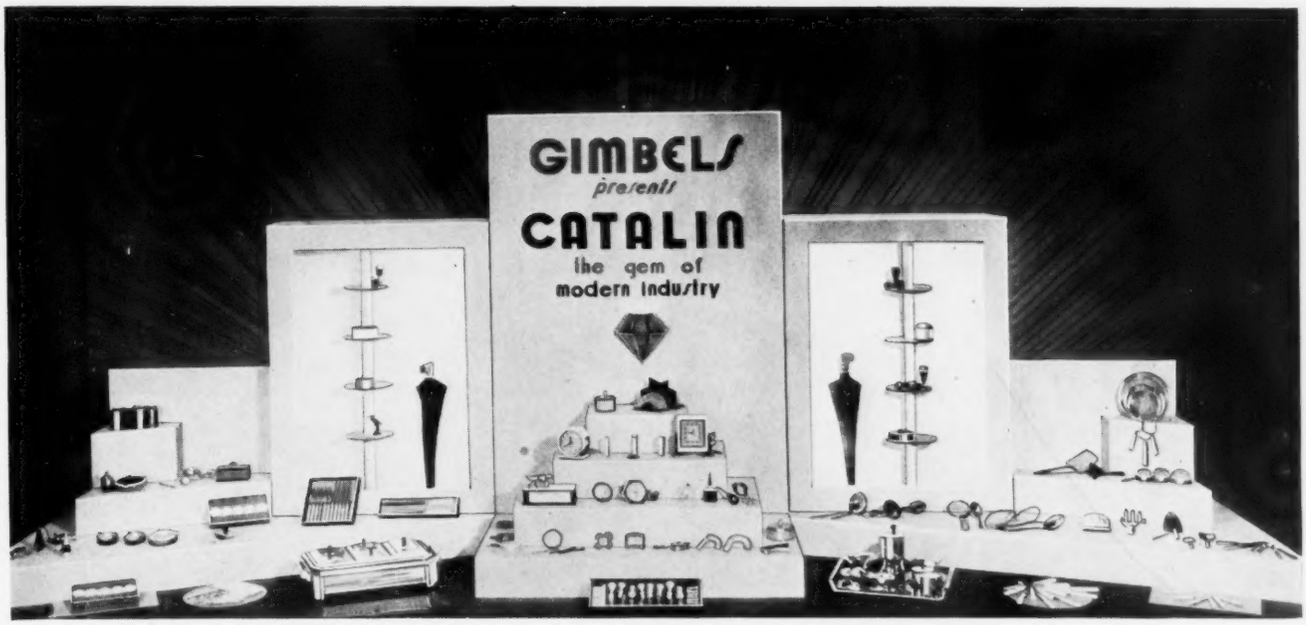
Right, Dr. John Morselli, Consulting Delegate of the "Carlo Erba" Society, Inc., and Vice President, National Federation Fascist Chemical and Allied Industries.

Prof. Alessandro Martelli, President Societa Anonima Raffineria Olii Minerali, of Fiume.

NEWS REEL

of Our Chemical Activities

Door knobs, umbrella handles and what not were featured in this exhibit of products made of Catalin, a cast phenolic material, recently displayed to the public in a window of Gimbel Brothers department store. Much interest was evinced particularly because of the recent growth, beauty of form, and utilitarian advantages which a synthetically molded product offers. Consumption of phenol grows larger every year.



Below and on opposite page, the Annual Dinner of the American Institute of Mining & Metallurgical Engineers, held on February 21st, at the Commodore. A precedent was established in having a member of the opposite sex, Congresswoman Isabella Greenway, at the speakers' table, and her informal speech proved to be one of the highlights of the evening. Howard N. Eavenson, of Pittsburgh, is the newly-elected president of the society.

Calco

INTERMEDIATES

ANILINE OIL
ANILINE SALT
NITROBENZENE
OIL OF MYRBANE
BETA NAPHTHOL
DIMETHYLANILINE
DINITROBENZENE
ANTHRAQUINONE

DINITROTOLUENES
TOLUIDINES
NITROTOLUENES
PARANITRANILINE
PARAPHENYLENEDIAMINE
PICRAMATE OF SODA
SULPHANILIC ACID
METATOLUENEDIAMINE

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Chemical Consumption

A digest of new products and processes in process industries for the user of chemicals.

New Textile Processing Materials of 1933

Without question many of the most outstanding developments in the textile department of chemical industry during 1933 were connected with wetting, levelling and detergent agents, which are now numerous and comprise compounds of widely differing composition, such as sulfated or sulfonated fatty alcohols, alkylated naphthalene-sulfonic acids, highly sulfonated oil or fatty compounds, and phenolic acids.

A firm, which has done much of the pioneer work in relation to sulfonated fatty alcohols, have given us new members of their Brilliant Avirol and Gardinol series. Brilliant Avirols AB and L333 aim at producing a more supple, softer and fuller handle on artificial silk and cotton materials than the L142 conc., L168 and L144 types. The two brands differ in the vivifying effects they produce. For the vivifying of cotton goods, the AB brand is the more suitable product. These substances belong to the highly sulfonated oil class.

Little need be said about the Gardinols, well known as soap-replacing agents of high stability to hardening substances and to acids. A newcomer is Gardinol ILE, the price of which enables its use on a large scale.

Other new products of this firm are Breviol KN, Lanaclarin LT, Stenolat V, and Hystabols D and F. Breviol KN is a wetting agent resistant to lime, acid, alkalis and salts, and specially suitable for the wetting of cotton, linen and artificial silk goods in cold to lukewarm baths. Lanaclarin LT is said to be a most effective combination of sulfonated fatty alcohol and fat solvent, suitable for the cleansing of all textile materials, among its fields for application being the desizing of artificial silk, the dyeing of hosiery and other knitted goods. Stenolat V is an emulsifying agent for olive oil, olein, groundnut oil and mineral oil. It permits the production of spinning and vivifying emulsions of neutral reaction and resistant to hard water, alkalis, acids and salt. Hystabols D and F are high-boiling solvents for all dyestuffs, and are claimed to be of great value for dissolving basic, acid and chrome dyestuffs. D is the more concentrated brand for printing purposes, while Hystabol F is for use in dyeing. These substances are resistant to lime, alkalis, acid and salt and indifferent towards thickening agents.

Another firm, among the earliest to realize the possibilities of the sulfonated fatty alcohols well known for the Sulfonated Lorol and Sulfonated Ocenol products, announced this year their most important achievement, Hylan, an entirely new agent. It is a specially standardized, colloidal preparation of a member of the family of cyclic amines, and of wide application in dyeing and printing.

One of the three important auxiliaries introduced to the textile industry last year was of the sulfonated fatty alcohol type. This is Lissapol A, a product designed to combine in a single chemical compound all the various functions required of a textile detergent. It is said to be one of the most remarkable members of its family, if only because of the variety of uses to which it may be put. Structurally, it is a long chain compound with the polar grouping SO_3Na at its head, thus fulfilling the modern conception of a substance possessing great interfacial activity.

A substance which is not a fatty alcohol sulfonate but which behaves in a similar manner under certain conditions, is Amoa Falco, evolved by a company which specializes in emulsifiers and emulsions. This product possesses astonishing emulsifying properties, imparting to the emulsion the ability to resist the action of lime and salts and to remain stable at boiling temperatures. The castor, olive and wax emulsions made from Amoa Falco are said to have become very popular for imparting a luxuriously soft finish to all kinds of goods.

A firm that has done much spadework in the standardization of chemical materials in colloidal forms put out some very interesting scouring and finishing substances. Gelsolan, for instance, is a chemical preparation combining the properties of a sulfonated fatty alcohol base and other highly sulfonated bodies, and is for use in scouring and finishing in acid or alkali baths. The most economical results are said to be obtained by reducing the quantity of soap used and introducing Gelsolan on an equal cost basis, and from that point by grading consumption down to the optimum point for the individual process. Gelsolan B is a colloidal preparation of higher sulfonates and phosphates; it has excellent scouring and finishing properties, but a smaller pH range of stability than the higher-priced Gelsolan.

This company has also introduced a range of products under the name of Gelsol. Gelsol 40 is a compound for the fulling and softening of all classes of textiles, giving, for example, an attractive velvety handle to viscose. It is dissolved in warm water and added to the final finishing bath. Gelsol 50 imparts a fuller handle than the 40 brand, but it is not so suitable for delicate

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fabrics. Gelsol 51 is a softening material for addition to dyebaths. It is stable to acid, alkali and hard water.

There are four other Gelsols which must be mentioned, if only briefly—Gelsol Brilliant Oil, Gelsol Wettagen, Gelsol Scouring Liquid and Gelsol Collosan. The Brilliant Oil is a highly sulfonated castor oil combined with catalytic hydrogenation products. It is intended for application wherever ordinary olein or Turkey red oils are required and is competitive with them. Gelsol Wettagen is a special colloidal preparation of selected terpenes with catalytic hydrogenation products and is for wetting out cotton, wool and rayon fabrics, especially in relation to substantive colors. Gelsol Scouring Liquid is a colloidal preparation of hydrocarbon and chlorine derived solvents for all scouring and kiering processes either in the open kier or under pressure. Its makers consider it of unequalled excellence for eliminating sizings, starches and natural pectins. Gelsol Collosan is a combination of glycerols with a sulfonated fatty alcohol in a standardized colloidal preparation and is a finishing agent for addition to acid or alkali dyeing and finishing baths.

This firm, by the way, is one of those which are concise and to the point in their descriptions of products and are not afraid to give information as to chemical composition, quantities to be used, and limitations.

One of the latest and most outstanding arrivals in the field of bleaching assistants is Biancal, an organic derivative of Caro's acid, HO-O-SO_2-OH, which is to be regarded as hydrogen peroxide in which one hydrogen atom has been replaced by a sulfonic group. It is of great stability. Added to the kierboiling lye it penetrates the fibres rapidly, and helps to bleach them evenly and completely without risk of damage. The difference between Biancal and other oxidizing agents lies in the nature of the components and the novel type of oxygen fixation. It penetrates deeply into the fibres, and gives off its oxygen slowly and gently and even at high temperatures has a gentle bleaching action.

Its scope of use is said to be very extensive. Besides being of value in the kier-boiling of cotton, it is also worthy of attention from bleachers of hosiery and wool. It stabilizes the hydrogen peroxide wool bleaching bath so completely that besides an excellent bleach being produced, the oxygen concentration of the bath diminishes considerably less than in an ordinary bath and catalytic decomposition is prevented. Silk may be degummed, then bleached similarly to wool and finally treated with Blankit, preferably with an addition of sulfonated fatty alcohol. In this way, bleached silk of unusual softness, suppleness and glossiness may be produced. In bleaching linen, Biancal has been found an excellent auxiliary product, enabling milder conditions to be employed. Oxidation, soaping and all the intermediate rinsings applied to vat-dyed goods are asserted to be replaceable by a single Biancal bath.

Little Holland is not to be outdone in the production of textile auxiliaries. A large number of these substances are produced there, especially starches and gums, but compounds of the sulfonated fatty alcohol type are also manufactured. One firm has a number of substances known as Servons which are resistant to hardness, acid and alkali. Servon PAC is recommended for use on all fibres in wetting out, levelling, scouring, soaping, washing and so on. Servon PC is for application only in scouring, soaping washing, and Servon PCL is for scouring and washing raw wool and woollen yarns giving an open handle.

The Meliorans and Oraprets are probably as well known as any wetting, scouring and finishing agents and new members continue to appear. Melioran CY Conc. possesses the same stability and fibre-protecting properties as the older F6 scouring product. It is of particular interest in the scouring of woollen piece goods and of great benefit when used in the scouring, bleaching and desizing of artificial silk fibres. It possesses great solvent properties for linseed oil sizes and acts as a stabilizer when used in conjunction with hydrogen peroxide for the removal of this oil. Orapret WTN is a softening agent for all classes of textile fibres where hard water only is available. It is extremely stable and can be used in conjunction with the usual sizing ingredients to act as a softener. Orapret SW100 is also a new softening ingredient, recommended for use in soft water. It, too, is very stable and used in the same manner as WTN. The firm manufacturing these has also made numerous works' trials with Melioran F6 in the dyeing of woollen material with acid dyestuffs, and found that this product gives exceptionally good results. Woollen piece goods which were known to give serious difficulties in dyeing have, they report, been dyed without any trouble when F6 has been used, the resulting material being exceedingly well penetrated and even in shade.

Among other new wetting and scouring agents are Lamepone A a condensation product of albumen and fatty acid, and the Neomerpins and Hydrophtals.

We now leave the group of wetting, dispersing, scouring and such-like assistants, and discuss a few of the new finishing compounds. Undoubtedly, as much attention is being devoted to compounds whose primary purpose is to enhance the selling properties of the finished materials as to those whose chief aim is to increase the efficiency of processes. Agents for use on artificial silk were perhaps the most numerous and most interesting newcomers of this type in 1933.

With certain artificial silk piece goods the difficulty of "slip" has arisen. This is partly due to the open weave of certain goods and partly to the smooth surface of particular qualities of rayon, causing the warp threads to slip with only a slight friction. It is claimed that pieces of this kind can be satisfactorily finished by means of Finish NS. A simple after-treatment on the padding machine or on the stenter with a solution of this compound will produce a very much firmer texture, overcoming the "slipping" difficulty, yet giving a satisfactory handle to the material. The manipulation of the product is extremely easy.

Ceranine W Conc. is a new softening agent for use in the finishing of artificial silk and cotton fabrics, both woven and knitted. It can be applied as a cold after-treatment, giving a very pleasant and soft handle and increasing considerably the draping quality of the fabrics. It may also be applied with advantage in the dyebath, and this procedure is to be preferred if an extra process is undesirable, either for reasons of cost or because of the nature of the fabric. The company has also been investigating the question of a softener for woollen piece goods, as several firms are interested in after-treating crossbreds and other grades of harsh wool with a view to obtaining a lofty and woolly handle. Finish KB, recently been put on the market, has been found very effective for this purpose. It may be employed on the dewing machine, in this way penetrating the pieces evenly and obviating a special finishing process. Many works are also employing Finish KB on an open width washer or on the padding machine. The appearance of certain piece goods is claimed to be considerably improved by Finish KB and particularly is the handle of the cloths made smooth and pleasing.—*Abstracted from the Dyer & Calico Printer.*

Textiles

Artificial Wool from Jute

Details of a process for converting jute into so-called "artificial wool" have been issued. It is claimed that brief immersion of the fibres in caustic potash of 25 to 30 per cent. strength is followed by a drying treatment in a rotating drum which imparts the desired availability to the atmosphere. The final product can be woven alone or in mixtures with natural wool, cotton, silk, etc.

Process for Degumming Raw Silk

The most effective agent for the removal of sericin from silk, which is the principal operation in degumming raw silk, is soap. Usually the degumming process is carried out at a high temperature in modern textile practice, which has been found to be disadvantageous, and resulted in efforts to reduce the temperature of the process. Relief is offered by using soap mixed with an

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enzyme for this purpose. It is pointed out that this development is of even greater significance to the textile industry, when it is remembered that often raw silk is woven with other textile materials, such as wool, acetate rayon and the like, and the woven fabric then degummed. The action of boiling hot soap liquor on such fabrics is deleterious.

The enzymes used belong to the class of proteases and are very effective in their action on proteins. Hence, they are able to decompose the sericin of silk at a moderate temperature to such an extent, that the degumming operation can be carried out at a temperature of 80°C. Degumming by this means can be complete, if the concentration of the enzyme is high enough and the duration of its action sufficiently prolonged. However, it is more economical to use soap as well.

New Textile Raw Material

After many attempts abroad, success has been attained in producing a textile raw material, which consists of a yarn, composed of flax and rayon. An economic feature of this process is that the yarn can be spun on existing flax machines, obviating the necessity of obtaining new apparatus. Fabrics thus made combine the advantages of linen with the attractiveness of rayon, and the yarns are of a fineness formerly unobtainable when using raw flax alone.

Patents—Textiles

Benzo-and naphthoquinone dyeing of cellulose derivatives. No. 1,944,413. Ellis, Olpin & Kirk, England, to Celanese Corp. of America.

Composition for treating crude fibers and textile products. No. 1,944,367 R. H. Pott, to Chem. Fabr. Pott & Co., Dresden, Ger.

Aliphatic amine sulfonic acid, for use in textiles. No. 1,944,300. Ott, Hentrich & Keppler, to I. G. Frankfort, Ger.

Diazotizing a cellulose ester to produce pattern effects. No. 1,943,377. G. H. Ellis, England, to Celanese Corp, N. Y. City.

For alkyl ethers of hydroxy aliphatic acids. No. 1,943,375. Henry Dreyfus, London.

Process for printing silks with chrome dyestuffs, gum thickening and chrome mordant. No. 1,942,774. J. J. Roulet, to Durand & Huguenin, Basle, Switzerland.

Metals and Alloys

Degreasing Compounds

The safe removal of grease from metal necessarily involves a process of emulsification. This can be effected by the use of substances with an alkaline nature, but apart from this other factors are involved which put more exacting demands on these substances. Besides having good emulsification powers the efficient degreasing compound will not form a scum or deposit with water—it will be easily rinsed from the metal and have no bad effect on it.

The choice of alkaline substances available are sodium carbonate, caustic soda, trisodium phosphate, soap and borax. Degreasing compounds generally consist of a mixture of these substances in such a way that optimum results are obtained. Looked at individually, sodium carbonate is a very useful component to have in the compound. Its chief virtue is that it rinses very easily and has only a very mild action on metals. It is also cheap. Caustic soda, on the other hand, is difficult to rinse off, and acts very powerfully on aluminum, zinc, brass, etc. Soap has good emulsification powers, but is difficult to rinse, as a greasy scum is formed with hard water. A substance which has many valuable properties as a degreasing compound is trisodium phosphate. Like the other substances it gives an alkaline solution in water. This solution has very good emulsifying properties and is easy to rinse. Its action on metals is only mild, as it is an effective buffer solution. Compounds containing trisodium phosphate are usually very efficient. Borax has only a limited use; it is easy to rinse and has fairly good emulsifying powers.

Suitable blends are not difficult to make up. A great factor is the kind of metal upon which they are to be used and the nature of the work. One mixture which has been used successfully is equal parts of trisodium phosphate and sodium carbonate. Substitution of a part of the carbonate by sodium sesquicarbonate is said to give superior results. However, by conducting a few simple experiments under the conditions of working much information can be obtained which will be of value in formulating.

A group of substances which may be of interest for degreasing compounds are the newer sulfonated products, such as the sulfonated fatty alcohols. The alkali salts of these substances have very desirable properties. They do not form a scum with water, consequently rinse very easily. Their emulsification powers are superior to those of soap, and they are excellent solvents and emulsifiers for all kinds of oily matter. There is no action on metals and their aqueous solution is not alkaline.

Metal Detergent

A new whale oil soap is being produced from the residual oils supplied by a firm which extracts vitamins from cod liver oil. For a long time this type of soap has been made chiefly from various fish oils, often mixtures, and this new product is said to have the advantage of uniformity, being made from only one kind of high grade oil. It is sold on a basis of 30 per cent. maximum moisture content, and is widely used in metal finishing plants for removing buffer compositions from finished work, retarding "spotting out," and as anti-corrosion protection for brass and copper.

Leather

Drying and Cleaning Hides

In Patent 1,911,896 drying is accomplished by subjecting hides to a flow of heated air at a pressure below atmospheric, the cleaning to be done during the drying period by introducing fine sand, sawdust and other cleaning materials.

Patent 1,918,909 deals with improved mechanical developments for the drying of hides while milling in a drum as covered by the aforementioned patent. The inventor describes equipment for introduction and removal of gas current and solid particles to hides in a rotary drum. A pneumatic separator allows the continuous circulation of cleaning agent with the drying gas current.

Strength of Chrome Tanning Liquors

The advantage of strengthening chrome tanning liquors progressively during tanning or to tan directly in a liquor containing the whole of the required solution is discussed by E. Barbier in *Cuir Technique*. The strength of the liquor is of little importance in regard to the quality of the tannage. The main point is that, by the use of stronger solutions, the time required is shortened This, of course, is an important factor when considered from the point of view that it involves the use of less motive power, and cash in the form of stock is locked up for a shorter period, as the finished goods are ready for sale earlier.

Further, it is not economical to tan in liquors containing less than 0.2 gm. per litre of chromium (2 lbs. per 1,000 gallons), as the time for adsorption of the chrome is prolonged excessively. The recovery of chrome from waste liquor involves clarification by decantation, precipitation of the chrome by an alkali such as soda, followed by heating, then collection of the precipitated chromium hydrate and solution in sulfuric acid. Figures are given which show that for a plant using 50 tons of chrome alum per year, such recovery is not profitable when depreciation of equipment, labor and material costs are considered, and the only recourse is to run the liquor to waste.

Leather Tanning Agents from Waste Sulfite Cellulose Liquors

Tanning substances may be prepared from sulfite cellulose lye, phenols, cresols, their derivatives, or other suitable compounds of the aromatic series, as well as natural tanning substances by

their inter-reaction with enzymes, desolases and oxygen. These agents rapidly diffuse through the skins, making it possible to tan the skins in a few days. It is possible, thereby, to fully tan leather, using natural tanning extracts, which, if used alone, would produce leather of insufficient strength. Preliminary tanning with the new agent enables the tanner to completely chrome tan leather and produce chrome fibre in the leather equal to that produced by natural plant tanning extracts. This prevents shrinking after drying and prevents the leather from acquiring a rubber-like nature. The process is essentially as described in two examples, one of which follows:

Twenty liters of cellulose sulfite waste liquor, 400 g. of 30 per cent. hydrogen peroxide, are mixed with 500 g. of peroxydase solution and allowed to stand several days. Six kg. of this reaction product with 100 kg. of water may be used for tanning. Instead of hydrogen peroxide, other compounds which split off hydrogen peroxide or active oxygen, such as perborates, may be used.

Chrome Tanning

Pickled skins or hides may be tanned with water soluble salts of zirconium, as zirconium sulfate, zirconium chloride or zirconium nitrate. The use of zirconium as a tanning agent alone or in combination with chromium, aluminum, formaldehyde, synthetic tanning agents or vegetable tanning materials is mentioned in patent.

Soluble Quebracho Extract

A greater part of the quebracho extract used by the tanning industry is sulfited in order to render the phlobaphenes soluble, thus producing an extract which gives liquors not liable to form deposits. Such solubilized extracts are known also to bring about a quicker tannage. Some difference of opinion exists as to the best method of effecting this sulfiting, some preferring an open vat, others favoring the autoclave treatment.

The latest tests describe the effect of sulfiting with mixtures of sodium sulfite and bisulfite by the open vat method. As the sodium sulfite is replaced by sodium bisulfite, the time required for solubilizing increases, but the color is improved. Color of the resulting extract is considerably modified by the subsequent addition of formic acid. Thus, in the table of results an extract sulfited with six per cent. of sodium bisulfite (calculated on the solid extract) gave a color of 5.0 units red (Lovibond) and 8.7 units yellow. By adding two per cent. of formic acid to the extract cooled to 50° C., this color was reduced to 3.9 units red and 6.2 units yellow. There appears to be some relation between the decrease in color and the reduction in *p*H.

Patents—Tanning

Sulfonic acids and peptized resins, retanning of chrome leather. No. 1,945,461. T. Blackadder, to Rohm & Haas, Philadelphia.

Solution bath of aluminum and gluconic acid for tanning. No. 1,941,485. R. Pasternack & G. O. Cragwell, to Chas. Pfizer & Co., Brooklyn.

Light colored tanning agent—I carbohydrate, I aromatic hydrocarbon, phthalic anhydride, with H_2SO_4. No. 1,941,475. A. P. Jaeger, to Selden Co., Pittsburgh.

Coatings

Aluminum Stearate with Various Solvents

Solvents may be divided into two groups according to their behavior with aluminum stearate. The first group, which consists of hydrocarbons, terpenes, oleic acid, and raw linseed and China wood oils, produce fine, almost transparent dispersions which remain suspended for a relatively long time. The second group, consisting of alcohols, ketones, esters, and ethers, produce coarse, opaque suspensions, which settle out in a short time.

Mixtures of aluminum stearate and the hydrocarbons leave films which are most desirable for flat finishes whereas the solvents producing opaque films leave chalky films that are undesirable for flat work.

When mixtures of solvents and aluminum stearate are heated, reactions that are detrimental to good results in flat work usually take place. In grinding aluminum stearate with the solvent, the temperature should be kept as low as possible. A pebble mill is considered superior to either iron or stone mills because less frictional heat is developed in this type of mill.

Rubber

Solvent Activator

A product is now available which greatly increases the solvent action of naphtha, affording ability to get more rubber into a cement of given viscosity. Time and power economies result by reduction of preliminary grinding of the rubber and churning it in the solvent. Further savings are effected by the consequent increase of plant capacity and reduced loss of solvent during churning. The cements gain in smoothness, fluidity, and uniformity, which are highly important technical advantages.

Chlorinating Rubber Process

English Patent 400,898 relates that chlorine is introduced into solutions of rubber of low concentration (two per cent. or lower) and viscosity, and the resulting rubber chloride solution gradually poured into hot water in which is immersed a disintegrating apparatus, whereby the solvent is evaporated and the rubber chloride reduced to a granular state. In one example, 35 kgs. raw rubber are dissolved in 1700 kgs. ethylene bromide and left to stand to decrease the viscosity, chlorine is passed through, and the solution allowed to stand for several days, treated with caustic alkalies, or exposed to light for several hours. The solution is run in a thin stream into a vessel containing eight parts glycerine and one of water heated to 135-140° C., in which an immersed propeller runs at high speed.

Oil-Resisting Rubber

It is now generally agreed that the rubber molecule can be regarded as a spiral chain or spring of cisisoprene molecular units. The "residual affinities" between the unsaturated centres of the isoprene units are the forces which hold the spring together. Straight (non-polar) molecules such as hydrocarbons can easily insert themselves between the coils of the spring and open up the structure (*i. e.*, swelling of the rubber), and in fact completely break up the spring (*i. e.*, dissolve the rubber). When the rubber is vulcanized, however, the sulfur forms bridges between the coils of the spring and reinforces it, so that it is more difficult to open. Vulcanized rubber, therefore, is not so readily attacked by oil. Molecules with a cross-bar (polar) cannot insert themselves between the coils, and hence short polar molecules (alcohol) cannot swell rubber.

Diesel fuel oil was used in the experiments carried out by Dr. W. J. S. Naunton, Maldwyn Jones, and W. F. Smith and described before the Institution of the Rubber Industry. This was used because it has equally drastic action upon both natural and synthetic rubber. It is exceedingly doubtful that synthetic rubber will ever replace to any extent natural rubber. Special-purpose synthetic rubbers, however, may be developed and may justify their existence.

The outstanding conditions in designing an oil-proof rubber were summarized as follows: (1) The rubber should be preferably unmilled (*i. e.*, latex compounded) or milling should be reduced to the minimum; (2) an antioxidant should always be employed; (3) the rubber should be cured with a liberal amount of sulfur, since apart from "blooming" there is no objection to free sulfur, or, if cured by means of an accelerator, a thiuram accelerator should be employed; (4) the cure should be pushed as far as ageing requirements and the danger of reversion will allow; (5) the softener should be one having no deleterious effect on oil-resistance; (6) the filler should be essentially magnesium carbonate and the quantity as much as the nature of the finished article will allow; (7) where the article will not be called upon to give service at low or higher temperatures, and not possess high-grade physical properties, the oil-resistance can be increased

by the use of a large proportion of ethylene polysulfide resins; (8) where the finished article will be called upon to give service at higher temperatures, such as hot oil gaskets, the best results will be obtained by using Duprene; (9) where extreme resistance to oil, combined with high-grade physical properties are required the best combination would be a mixture of Duprene with an ethylene polysulfide resin.

Rubber Vulcanization

In English Patent 401,038 it states that products containing aluminum silicosulfides, or mixed sulfides of aluminum and silicon, which furnish sulfuretted hydrogen on contact with water, are used in rubber vulcanization. This is accomplished by reacting an alloy or mixture of aluminum and silicon, preferably in the form of a fine powder, with sulfur at an elevated temperature. The reaction may be started by local heating or by a primer, the resulting conditions being such that it proceeds with the mass in a molten state; in the latter case briquettes of the reaction mixture may be added to the molten mass as the reaction proceeds. The amount of sulfur used should not exceed by more than three per cent. that theoretically necessary. In one example not involving fusion, a red-hot iron rod is used to start the reaction; in another a priming charge of powdered aluminum and silicon is employed and fusion takes place. By incorporating other metals such as iron or suitable compounds thereof in the reaction mixture, mixed sulfides containing also sulfides of these metals may be obtained.

Patents—Rubber

Treatment of latex by soluble salt of certain derivative of sulfuric acid on an alcohol and a di-aryl. No. 1,946,003. R. L. Sibley, to Rubber Serv. Labs., Akron, O.

Treatments of rubber; by formic acid, nitroso mixture or naphthol derivative. No. 1,945,576-7-8. W. P. ter Horst, to Naugatuck Chem. Co., Naugatuck, Conn.

Carbon dioxide under pressure, immersed in latex for deposition of rubber. No. 1,945,256. R. B. F. F. Clarke, to Imp. Chem. Ind., England.

Thiuram sulfide in rubber vulcanizing. No. 1,944,346. W. Huhn, Cologne to I. G. Frankfort, Ger.

For retarding the vulcanization of rubber. No. 1,943,797. J. R. Ingram, to Rubber Service Labs., Akron, Ohio.

Rubber adhesives. Nos. 1,943,423-4. W. W. Dunfield to Naugatuck Chem. Co., Naugatuck, Conn.

Miscellaneous

Testing Cellulose

A sub-committee of the Fabrics Research Committee, London, has recently recommended a standard method of conducting viscosity tests for cellulose solutions and of expressing the results obtained. A report on the system proposed has been published by H. M. Stationery Office. In reviewing the work so far done, report showed that there was no demand for a test of strict academic accuracy. In industry, the first use made of viscosity measurement was as a control of the cellulosic raw material for nitration in the explosives industry. In textile manufacture, significance of the test was found in its close relationship with the tensile strength of the solid fibre. In the pulp and paper industries, only the experimental stage of the use of the test had been reached, but interest was shown, as viscosity determinations afforded a convenient method of grading rags for strength.

Ammonium Phosphate as Fireproofing Agent

Results of a study of the conditions necessary for the combustion of timber, of the thermal considerations affecting fireproofing, and the methods available for this purpose, confirm the following conclusions: (1) Timber may be rendered comparatively fireproof by impregnation with suitable salts; (2) ammonium phosphate, sodium tungstate, sodium silicate and certain other salts may be used as fireproofing agents, but of these ammonium phosphate is to be preferred; (3) for any given specimen there is an optimum impregnation with salt beyond which the fireproofing effect is comparatively small; (4) for ammonium phosphate a concentration of 350 grammes per litre produces the best results; (5) if soaked for a sufficiently long period, optimum effects can be produced by simple soaking in cold solution; (6) the application of reduced pressure before soaking accelerates impregnation; (7) within limits, the time of application of the reduced pressure does not materially affect the fireproof properties.

Patents—Miscellaneous

Agricultural Chemicals

Colorless pyrethrum household insecticide. No. 1,945,235. N. A. Sankowsky & D. H. Grant, to Stanco, Inc., N. J.

Disintegrating tobacco stems into colloidal state to produce homogeneous cellular fertilizer. No. 1,944,788. F. W. Genz, to Va-Car. Chem. Co., Richmond, Va.

Fertilizer; gaseous nitrating agent before heat and pressure. No. 1,944,046. W. H. Waggaman, to Oberphos Co., Baltimore, Md.

Alkyl mercuric acetate seed disinfectant. No. 1,943,540. M. S. Kharasch, to duPont & Co., Wilmington, Del.

Bactericide and fungicide, in sulfate and Cal. hydroxide. No. 1,943,181. W. J. Liipfert, Fort Valley, Ga.

Petroleum

Olefines by passing gas of butane, propane and ethane, through tinned manganese-copper tube. No. 1,945,960. F. Winkler & H. Haeuber, Ludwigshaven, Ger.

Phenol-aldehyde resin, with polymerized petroleum distillates producing polymers. No. 1,945,719. F. A. Apgar & A. Runyan, Hammond, Indiana to Sinclair Ref. Co., N. Y. City.

Catalysis of addition product of unsaturated hydrocarbons. No. 1,944,161. J. P. Baxter, to Imp. Chem. Ind., England.

Insecticide of mineral oil and a furoic acid ester. No. 1,942,892. E. W. Adams & G. M. McNulty, to Standard Oil Co., Chicago.

Reagent for resolving petroleum and water emulsions. No. 1,941,886. C. Fischer & W. T. Reddish to The Kontol Co., Dallas, Tex.

Company Booklets

C111. E. I. du Pont de Nemours & Co., Wilmington. *The Du Pont Magazine* for February features a description of Union Pacific's new train; Cellophane as a fabric of many versatile uses for interior decorating; story of why Wanamaker uses "Dulux" finishes on its delivery cars; and finally, why vat dyes are better.

C112. Eastman Kodak Co., Rochester, N. Y. February issue of *Synthetic Organic Chemicals* deals with non-aqueous solutions, also ethylene oxide and some of its reactions. A list of the new Eastman organic chemicals available is also given.

C113. Givaudan-Delawanna, Inc., 80 Fifth ave., N. Y. City. January issue of the *Givaudanian* contains many helpful hints for a number of fields where scent is finding a strong selling appeal. Those in such fields should arrange to receive this interesting booklet regularly if they are not already doing so.

C114. Hercules Powder Co., Wilmington, Del. January issue found the *Hercules Mixer's* editor in a reminiscent mood and the main theme is a comparison of today and 21 years ago. Hercules has just become of "age" but it has been a mighty "big boy" for a long time.

C115. Mallinckrodt Chemical Works, St. Louis. The usual monthly price list for February has been issued showing a number of important price changes.

C116. Merck & Co., Rahway, N. J. As was announced in this column last month Merck is now publishing a monthly price list instead of including them in the quarterly magazine. Users of fine, industrial and photographic chemicals should be on the mailing list.

C117. Monsanto Chemical Co., St. Louis. For some years the general concensus of opinion of readers of *Monsanto Current Events* was that it could not be better. The editors themselves have evidently dissented, for February issue (first of the 15th year of publication) finds it still bigger and better in every way. Feature articles include: "Man's Ingenuity Has Made Cotton King," by E. R. Chapin, Merrimac; the story of Swann development; and "Scent Becomes A Rival of Color," by J. A. Berninghaus, Monsanto general sales manager.

C118. Philadelphia Quartz Co., 121 S. 3rd st., Philadelphia. *Silicate P's & Q's* reports a process for sweating paraffin wax with the aid of a silicate solution.

C119. Rolls Chemical Co., 477 Ellicott Square Bldg., Buffalo, N. Y. This house-organ continues to grow and grow and grow.

C120. R. T. Vanderbilt Co., 230 Park ave., N. Y. City. Company has just issued a booklet completely describing Durite oil soluble resin No. 1301.

C121. R. T. Vanderbilt Co. January-February issue of that particularly valuable, highly technical journal for the rubber field —"*The Vanderbilt News*" —features data on the compounding of automobile inner tubes.

Chemical Industries,
25 Spruce Street, New York City.

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PHILADELPHIA QUARTZ COMPANY

PQ EST. 1831

Chemical Production

A digest of plant management, design, equipment and containers for the makers of chemicals.

Where Can the Consulting Chemist Help?

Chemical manufacturers do not make use of consultants to anything like the extent they might do with advantage to themselves. Large manufacturing organizations can afford to employ their own experts, including a staff whose duty it is to keep in close touch with technical and patent literature and call attention to all matters of interest to them, but even they must at times have recourse to specialized research bodies in order to get the latest information and the best advice on special problems which they are not in a position to investigate.

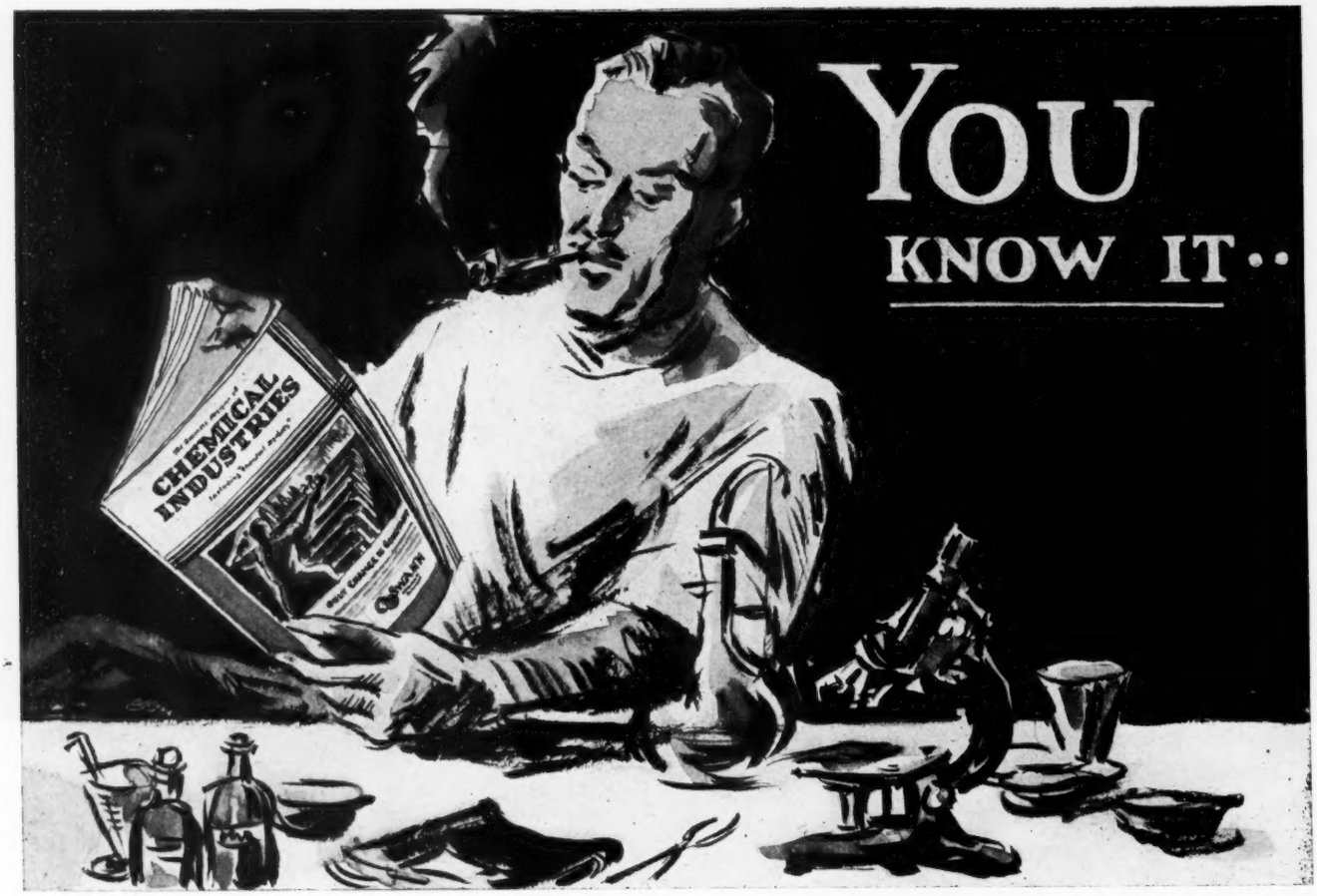
The smaller manufacturer, however, is in a very different position, and is far more dependent upon outside help. There are many ways in which the consultant can help. First, there is the purchase of plant. The small manufacturer is very much in the hands of the plant maker, both as regards the type of apparatus to be selected and the price to be paid for it. His knowledge of the various makers of particular kinds of apparatus is also usually limited, for he does not often buy new plant, and when he does he goes to a very restricted number of firms. Hence it is no uncommon thing to find in small chemical works some expensive piece of apparatus on the scrap heap or derelict because it proved unsuitable for the use to which it was put. It is often found, too, that an excessive price has been paid for some apparatus which could have been obtained at a much lower price elsewhere. Plant makers cannot be blamed for this state of affairs. They are out to sell their own type of apparatus; they are often given insufficient information in the inquiry as to the requirements to be fulfilled, and even if they do get full information and find that their own apparatus is not likely to be completely suitable, they will still—in most instances—effect a sale if they can.

If, on the other hand, a consultant is called in, he is in a much better position to obtain for the manufacturer the apparatus best suited to his needs, and at the lowest possible price consistent with a sound job. He has a much wider knowledge of the plant makers; he knows from experience what a given apparatus ought to cost, and, after seeing that the inquiries are sent out complete with all the information necessary, and accompanied by sound and reasonable specifications as to quality of materials and workmanship, and guarantees of performance where these are called for, he can deal with the quotations quite impartially and recommend that which assures the best chance of satisfactory operation combined with best value for money. Nor do his services end there for he can, if desired, supervise the erection and the starting up of the plant. Should difficulties arise, he can investigate them and advise as to the best way of getting over them, and finally he can act as unofficial arbitrator in any dispute between the manufacturer and the plant maker.

The manufacturer may say that this reads very fine, but how much is it going to add to his bill for the plant. From the writer's experience it would be safe to reply that in 19 cases out of 20 the manufacturer, so far from having to pay more, will (inclusive of the consultant's fees) have to pay substantially less for his plant, and will get a better one than is the case where he deals with the matter himself.

Apart from the purchase of plant, and prior to it, the consultant can often give valuable help with the layout of the proposed plant so as to secure the best utilization of buildings and the minimum of handling of materials with reduced labor costs. He can also advise in cases of undue corrosion, or wear and tear of plant due to the use of unsuitable materials or faulty design, or of contamination of the products by the materials of construction. There are many problems, too, in the auxiliary services of the factory, apart from the actual process plant, where his help may very probably result in a notable reduction of costs—the purchase of fuel on a scientific basis, the efficiency of steam raising, the question of water supply for cooling purposes, the electrical distribution of power, the provision of fire-fighting equipment, the adoption of flame-proof electric motors and fittings where there is danger of explosion, and so on.

There is also the whole question—now a very urgent one—of the modernization of old factories and the substitution of up-to-date processes and plant in place of obsolete and non-competitive ones. Here the consultant is almost indispensable. It is his business to keep in touch with the latest developments in all branches of chemical manufacture and the last word in plant design, in a way that the small chemical manufacturer has neither the time nor the opportunity to do. There is no doubt whatever that those manufacturers who are still carrying on with hopelessly out-of-date equipment, and who do not pay prompt attention to these warnings, will soon find themselves out of business. They may be afraid that the cost of modernization will be more than they can afford, but they probably have no idea as to how much that cost would be. The consultant can tell them, and they may find that it is not nearly so high as they feared, and that the reduction in costs due to modern methods would soon pay off the capital expenditure. It is certainly well worth while going into the question and having reliable estimates prepared. Even where it is found impossible to modernize the whole factory, there may be some particular process which has ceased to be competitive, and which could be replaced by a more efficient one without much expense.



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There is also the question of finding new products to make, particularly those which are now imported and not at present manufactured in this country. Here the consultant can help with suggestions and by investigating the patent position. There are cases where plants are idle for part of the year and new uses for them are sought.

A final word may be said about the basis of payment for the services of consultants. The traditional basis of a percentage on the value of new work carried out is a bad one, because, on the one hand, it is rarely a true measure of the amount of work and time the consultant has to devote to the job, and on the other, it may incline the client to feel that the consultant has an interest in making the job as big and expensive as possible. The writer believes in basing his charges on the saving effected or the additional profit secured, or, if this is not possible, strictly on the amount of work and time involved.—*The Chemical Age*, British, Dec. 30, '34, p. 594.

Coal Tar Chemicals

International Coal Tar Markets

When two or more commodities are produced together as the result of a single process, the supply of those which are relatively of minor importance does not readily respond to changes in demand, and the price of these by-products therefore tends to be erratic. The market for coal tar products has recently furnished an interesting example of the vagaries which occur in such cases of "joint-supply." Coal tar is one of the by-products of gas and metallurgical coke. Coal is not distilled primarily for the sake of these by-products, for although the value of the total production of coal tar is substantial, it contributes only a relatively small proportion to the value of the output of gas works and coke ovens. The supply of coal tar varies, therefore, with changes in the demand for gas and metallurgical coke rather than with the demand for coal tar, whose price is thus liable to extreme fluctuations.

U. S., Great Britain, Germany and France normally account for about 80% of the world's output of coal tar. While coke ovens furnish the larger share of the production in the U. S. and in Germany, Great Britain's output is derived in approximately equal proportions from gas-works and coke ovens.

The catastrophic decline in the activity of the world's iron and steel industry between '29 and '32 and the consequent reduction in the demand for metallurgical coke brought about a sharp contraction in the supply of coal tar from coke ovens. Although the fall in the output of gas was much less pronounced, the total supply of coal tar declined considerably. Since the demand for coal tar itself did not show a proportionate decline, its price rose sharply during this period. The advance in the price of coal tar is the more striking as it coincided with a sharp fall in the price of coke and other raw materials.

The decline in the production of coal tar was most pronounced in the U. S. and in Germany. During the first year of the depression the demand for coal tar declined faster than the supply, with a consequent fall in prices. In the following two years the pace of the downward movement of supplies exceeded the reduction in demand, and prices rose by no less than 67%. The revival of the iron and steel industry in '33 led to an increase in the demand for metallurgical coke and hence to an expansion in the supply of coal tar, which soon began to exceed demand at the current level of prices. Hence, while the prices of coke and other raw materials tended to rise, the quotation for coal tar declined rapidly.

The freakishness of price movements was, however, still more pronounced in the case of some of the products derived from crude coal tar. The price of each of these products varies not only with the supply of coal but also with the demand for the other coal tar products.

The developments in the market for coal tar pitch have been especially interesting, for its price has been liable to violent fluctuations owing to the relative inelasticity of demand and because of the difficulty of finding suitable substitutes. The production of coal tar pitch, which is used chiefly as a binder in the manufacture of briquettes, absorbs a substantial proportion of the output of crude coal tar. The proportion of the world's output of coal tar pitch employed in the manufacture of briquettes rose from 55% in '29 to 58% in '30 and 62% in '31.

U. S. and Germany are the leading producers of coal tar pitch The relatively smaller output of Great Britain is largely due to the fact that the briquette industry is relatively unimportant in this country. Out of a total of 18 million tons of briquettes produced in the world as a whole in '31 Great Britain accounted for only 870,000 tons, or 4.8%. The proportion of the world production of coal tar pitch entering international trade is quite substantial. In the past Great Britain and Germany have been the principal exporters, but more recently the U. S. has rapidly increased her share of the world's exports. France's exports are relatively small.

Owing to the growing shortage of supplies quotations rose by leaps and bounds between June, '31, and Dec., '32. The advance in prices during this period amounted to no less than 122% as compared with a rise of 82% in the quotation for crude coal tar. The relative inelasticity of the demand for coal tar pitch is partly due to the fact that the average pitch content of briquettes is only about 7%. Nevertheless, the enormous rise in prices encouraged the search for a substitute, which was found in the form of petroleum tar pitch. Experience showed, however, that petroleum tar pitch could not be regarded as a satisfactory binder. On the other hand, a number of tests showed that it can be mixed to a small extent with coal tar pitch without serious detriment to the quality of the briquettes.

The anxiety of consumers was, however, soon dispelled, for as soon as production of coke began to increase early in '33 the price of coal tar pitch declined as rapidly as it had risen in the previous year. If the expansion in the world's iron and steel industry continues it is quite probable that the downward movement will continue, especially as a result of the increase in U. S. exports stimulated by the depreciation of the dollar. In the absence of an international agreement among producers designed to maintain prices by restricting supplies, the Pitch Marketing Company, which acts as a central selling agency for producers in this country, will scarcely be able to stem the decline in prices to a more reasonable level.—(*The Economist*, British, Jan. 6, '34, p. 6).

Patents—Coal Tar

Mixture of pitch and pitch oil as binding material. No. 1,946,446. E. O. Rhodes & E. H. Hyde, to Amer. Tar Prod. Co., Pitts.

For the nuclear chlorination of benzene compounds. No. 1,946,040. W. C. Stoesser & F. B. Smith to Dow Chem. Co., Midland, Mich.

Orange to red and blue-red azo-dyestuff. No. 1,946,010. G. Bonhote, to Ste Chem. Ind., Basel, Switzerland.

4.5-dimethyl-7-chloro-oxythionaphthane and its indigoid derivatives. No. 1,945,923. N. Steiger, Ger., to Gen. Anil. Wks., N. Y.

Bituminous paint, from bit. rock, HNO_3, H_2SO_4 and collodion. No. 1,945,869. S. W. Sparks, Bellevue, Pa., to Lytle, Stofiel & McPherson.

Thioindigoid dyestuffs. No. 1,945,484. A. Hagenbocker & R. Brune, to Gen. Anil. Wks., N. Y. City.

Yellow-brown cotton pyranthrone dyestuffs. No. 1,945,405. W. M. Murch, Hamburg, N. Y., to National Anil. Co., N. Y. City.

Recovery of phenols from tar oils. No. 1,945,376. J. G. Peake, to Timbrol Ltd., Rhodes/Sidney, N. S. W.

Printing paste of vat dyestuff and alkali metal salt. No. 1,945,221. S. Gassner & H. Berthold, to Gen. Anil. Wks., N. Y. City.

Green, greenish-blue and violet vat dyestuffs of anthraquinone-acridone series. No. 1,944,986. Kranzlein, Boedeker & Becker, Ger., to Gen. Anil. Wks., N. Y. City.

Production of tar acids from distillates. No. 1,944,681. W. C. Cooper, Jr., Cal., to Barrett Co., N. Y. City.

Nitrating mono-azo-compounds for azo dyes. No. 1,944,645. E. Hug & M. Muller, to Durand & Huguenin, Basel, Switzerland.

Azo dyestuffs of various shades. No. 1,944,539. Zitscher, Morschel & Luce, Ger., to Gen. Anil. Wks., N. Y. City.

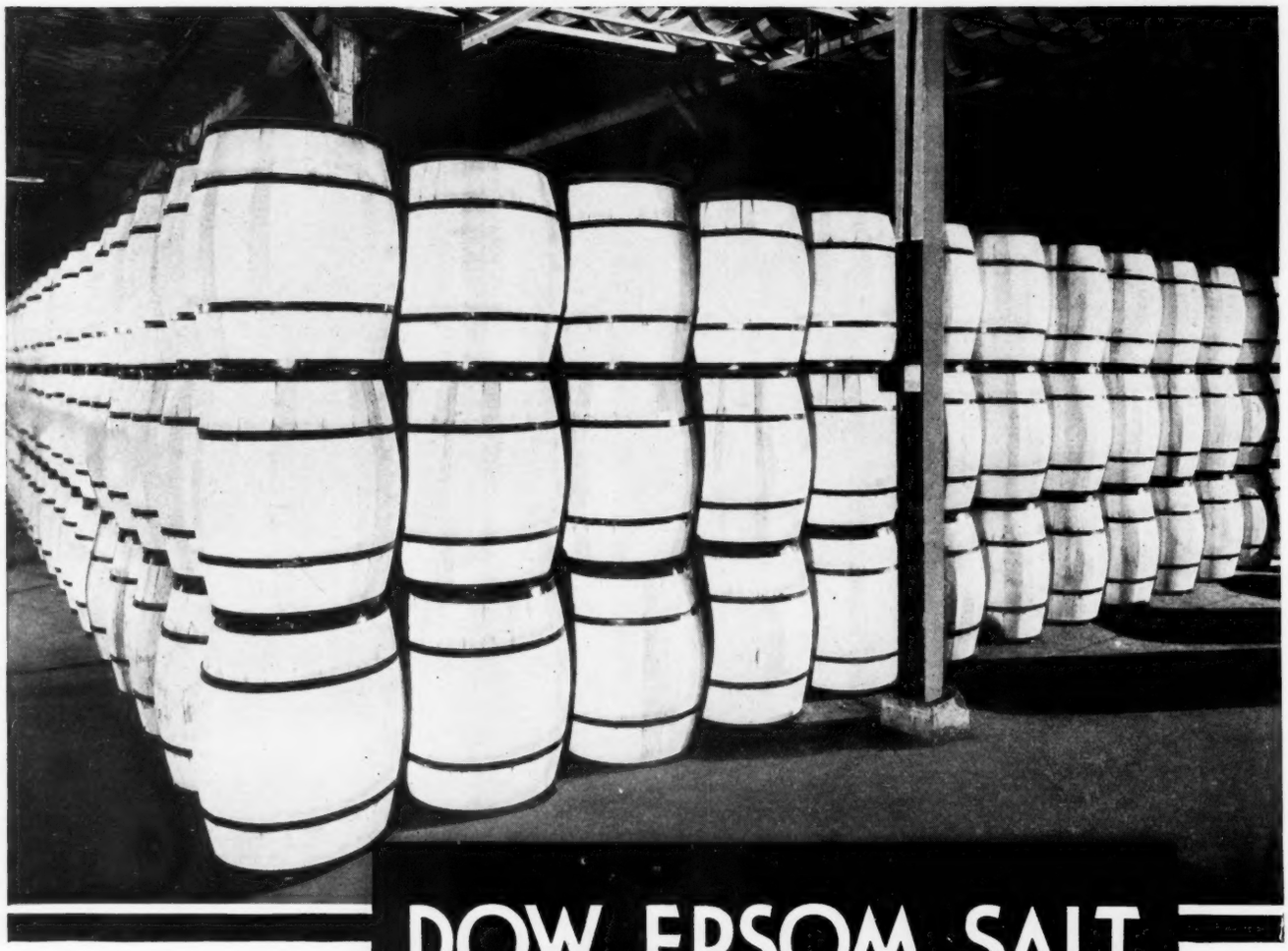
Sulfur dyes by thionating in mono-ethyl-ether of ethylene glycol. No. 1,944,250. H. A. Lubs & G. C. Strouse, to duPont & Co., Wilmington, Del.

Amino-dialkoxyanthraquinones. No. 1,943,876. P. Nawiasky & B. Stein, Ger., to Gen. Anil. Wks., N. Y. City.

Arylamino-I-hydroxy-naphthalene-2-carboxylic acids. No. 1,943,872. L. Laska & O. Haller, Ger., to Gen. Anil. Wks. N. Y. City.

Azo-dyestuff, greenish black; with formaldehyde and copper salts fixatives. No. 1,943,727. Richard Fleischhauer, Frankfort, to Gen. Anil. Wks., N. Y. City.

Compound of the benzanthrone-pyrazolanthrone series. No. 1,943,719. Wilke, Stock & Schubert, Frankfort, to Gen. Aniline Wks., N. Y. City.



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MIDLAND, MICHIGAN

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TRADE DOW MARK

Preparation of non-dyeing metalliferous sulfurized phenol derivatives. No. 1,943,179. V. Kartaschoff & O. Knecht, to Sandoz Chem. Works, Basel, Switzerland.

Process for azo dyestuffs. No. 1,943,170. F. Felix, to Soc. Chem. Ind., Basel, Switzerland.

Tertiary alkyl substituted orthodihydroxy benzenes. No. 1,942,827. L. E. Mills & B. L. Fayerweather, to Dow Chem. Co., Midland, Mich.

The making of alkyl amino carbinols. No. 1,942,820. F. H. Kranz, to Nat. Anil. Chem. Co., N. Y. City.

Hydroxy-benzo-quinoline-carboxylic acids. No. 1,942,108. L. Laska & O. Haller, Offenbach, to Gen. Aniline Wks., N. Y. City.

Sulfur black cotton dye by thionating a nitrophenol. No. 1,941,991. H. A. Lubs & H. W. Walker, to duPont & Co., Wilmington, Del.

British Publish New Standards

Seven new British Standard Specifications covering phenol and the whole range of the more generally used cresylic and carbolic acids have been published by the British Standards Institution. Copies may be obtained from the Publications Dept. 28, Victoria st., London, S. W. 1; price 2s. 2d. each. Specifications have been prepared by the Chemical Divisional Council of the Institution, the following interests being directly represented on the Committee entrusted with the preparation of the various documents: The Association of British Chemical Manufacturers, the Association of Tar Distillers, the British Disinfectant Manufacturer's Association, and the Standardization of Tar Products Tests Committee.

Laboratory Operations

Accidents in the chemical laboratory are as avoidable as any other accidents are. The few times when accidents are due to wholly unforseen causes which might be classified as "acts of God" are no more numerous than in any other profession. The accidents that occur in chemical laboratories are, almost without exception, avoidable with care.

Many of the accidents in the laboratory are traceable to fire. Fire is always a problem for safety in the chemical laboratory and especially in the organic chemical laboratory where many inflammable solvents are used. Heating inflammable liquids like benzol, naphtha, gasolene, ether, carbon disulfide, and many others should be done without the aid of flame at all, if possible. If the temperature required is below a hundred degrees, a water bath or brine bath may be used. Such a bath can be heated electrically with a heating unit controlled by a thermostat of the De Khotinsky type. If the temperature needed is higher, an oil bath with electrical control may be used. Glass flasks, even when made of pyrex, should never be heated in a direct flame. When agitating a solution of an inflammable liquid, great care should be taken to see that the agitation is not interrupted so that no overheating, with consequent boiling over, will result. Almost invariably, when a flask containing inflammable liquids is heated with a direct flame and the agitator stops for some reason, a fire will take place when agitation starts again due to overboiling of the superheated liquid. With an electrically heated fluid bath, this danger is overcome.

Sometimes, test-tubes containing inflammable liquids are carelessly heated and result in fires due to vapors boiling over the side of the tube. If it is necessary to heat liquids of this nature in such a manner, it should be done carefully over a small, cool flame. Never heat inflammable liquids in open containers such as beakers.

Every chemical laboratory should have certain safeguards against fire. Fires of a chemical nature are peculiarly difficult to extinguish. The solvent fire may be extinguished with a common acid-soda or Foamite extinguisher of sufficient size. Usually, a small carbon tetrachloride extinguisher is used. While quite effective for small fires, these are sometimes dangerous. Large laboratory fires should be extinguished by other means. It is well known that carbon tetrachloride forms poisonous fumes of phosgene in small amounts when sprayed into a fire. While the gas is not formed in sufficient amount to cause death, it is certainly of an unpleasant and possibly dangerous nature. The best and simplest aid to small fires on chemical apparatus is the rag. A plain rag of any kind should be kept handy when heating any liquid which might take fire. The rag can be pushed down on the piece of apparatus to exclude air, which will put out any small fire instantaneously. In laboratories where small-scale plant experiments are being tried out, the regulation emergency shower should be within easy reach. Next to burns from fire, burns from alkalies, acids, and corrosive liquids, like phenol are most numerous. Acid and alkali burns require immediate flushing with water and medical attention. Burns from phenol must be washed off with alcohol immediately and then given expert attention. Other corrosive liquids require individual treatment for their immediate removal.

No acid burn should ever be neutralized in the college freshman manner with alkalies, or vice versa for alkali burns. Water is the only first antidote. Other burns of more complicated nature, as those from bromine, require medical attention at once. Self-medication should never be resorted to and all cases of chemical burns of any nature should be treated by competent physicians.

Every laboratory should have a woolen blanket available for fires in which the clothing of the chemist burns. These blankets should be so folded that one jerk from their receptacle will entirely unfold them. They should be pure wool and heavy enough and sufficiently large to wrap an adult.

Goggles of various kinds are a prime necessity for the chemist in his experiments. They protect his eyes from acids, alkalies, poisons, and shattering glass apparatus. No experiment that involves any hazard of explosion or fire should be performed without goggles. The structure of goggles for the chemical worker should be such that the glass will withstand shattered glassware and the goggles should fit the face snugly. If there are any holes on the sides, they should be very small so that they would stop any small drops of acid from entering. The goggles should be well built and comfortable so that they may be worn for reasonably long periods without discomfort.

Assistants and helpers who wash dishes with acids as cleansing agents should always wear goggles and gloves. If acids are handled, rubber gloves of the gauntlet type of heavy rubber should be worn. They should not be patched when they develop holes but should be discarded immediately. For handling hot beakers, oil baths, and flasks, leather gloves, which are non-conducting of heat, should be employed and not rubber gloves of any kind.

Handling Poisonous Materials

Next to fires, accidents from poisonous materials, fumes, and gases, and accidents from mishandling corrosive chemicals are most numerous. Whenever a poisonous gas is generated, it should be absorbed in a container or trap of some kind containing a neutralizing chemical. If this is not possible, it should be drawn off with vacuum under a hood. Sometimes, a vacuum may be used to draw off poisonous fumes by inserting the end of a rubber tube in the outlet of the apparatus.

A common cause of mouth burns is the use of the mouth to fill a pipet. In handling any dangerous liquid, it is best to apply vacuum to fill the pipet with the aid of a piece of rubber tubing to a vacuum line.

Cylinders of gases like chlorine and ammonia should be transported on small carts especially built for them in which the cylinder is securely contained. If this is impracticable, small cylinders, about a foot high, of the gas used may be obtained. They are easier to handle and can be placed upon a small balance to determine the amount used during a reaction. If extremely poisonous gases such as phosgene are used, a special hut with ventilation outside should be built adjacent to the laboratory. All experiments with the poisonous gas can be performed in this hut. Before entering, the door should be left open for two minutes to allow any traces of residual gas to escape.

In the handling of glassware, only that glassware should be used which is strong and resistant to heat and sudden cold. Soft glass for tubing and rods should be handled with sharp triangular files. All cutting should be done with the aid of a towel or rag

to protect the hand. Especially is this necessary when putting a piece of glass tubing through a stopper, either cork or rubber. Many chemists suffer painful cuts through neglect of this rule.

It is especially important from the safety point of view for the chemist to protect himself from the accidents due to vacuums. Vacuum distillation is a common chemical process in which quite a few accidents occur due to collapse of the glassware in which the experiment is performed. In conducting experiments which demand vacuum, care should be taken to see that vacuum flasks of sufficient thickness are used. Flat-bottomed flasks should never be used and care should be taken to avoid possible obstruction of the distillation condenser. In collapse of glass flasks, glass is widely scattered and strong goggles should be worn. Desiccators also frequently collapse under vacuum and should be guarded with wooden boxes with an outlet for the stopcock.

In operations requiring pulverizing, protection should be obtained in the form of an aspirator mask. Poisonous powders and chemicals, as potassium cyanides, alkaloids, hypnotics, and unstable compounds, should be handled by the chemist and not by any assistants.

In experiments involving reactions in which the outcome is possibly dangerous, proper precautions should be taken. If the probable outcome is thought to be of a violent nature, it is always a wise step to determine in a test-tube, with an infinitesimal amount, just how the reaction will proceed. If a tiny amount is first tried out, no dangerous results are obtained. If the first small amount causes no danger, a slightly larger amount can be used to see at what point it becomes dangerous. A few trials of this kind are necessary to determine the violence of any reaction and can be quickly performed. In other work of the chemist, there are always certain combinations of chemical and physical forces which are dangerous. Thus, the use of oxygen under high pressure, and heat through apparatus containing oil may result in violent explosions. All laboratory pressure vessels, as autoclaves, should have safety valves or disks with the outlet pointed in such a direction that no accidents may befall.—Edwin C. Buxbaum, "Safety in the Chemical Laboratory," *Journal of Chemical Education*, Feb. p. 75.

Patents—Fine Chemicals

Water-soluble condensation products, aromatic hydroxy compound with a halogenated aralkylhalogenide. No. 1,946,430. Thauss, Mauthe & Doser, Cologne, to Gen. Anil. Wks., N. Y.

Preparation of lobelia, alkaloids, derivatives and allied compounds. No. 1,946,345. H. Wieland, to C. H. Boehringer Soehne, Nieder-Ingelheim, a/R.

For aliphatic organic acids. Nos. 946,257-8-9. J. C. Woodhouse (No. 256), G. B. Carpenter No. 257-8-9), W. H. Carothers (No. 258). All to duPont & Co., Wilmington, Del.

Preparation of carboxylic acid. No 1,946,256. J. C. Woodhouse, to duPont & Co., Wilmington, Del.

Amine contact in purifying fluorinated aliphatic hydrocarbons. Nos. 1,946,195-199. H. W. Daudt, to Kinetic Chem. Inc , Del.

Method for 3-menthone. No. 1,946,115. W. Schoeller, E. Schwenk & E. Borgwardt, to Schering-Kahlbaum A. G., Berlin.

Production of nitrous oxide. No. 1,946,114. Leo Schlecht & A. von Nagel, Ger., to Winthrop Chem. Co., N. Y.

Amino-aromatic ketones, benzene or naphthalene series. No. 1,946,058. E. C. Britton & F. Bryner, to Dow Chem. Co., Midland, Mich.

Fine, dry pectin product with acetonedicarboxylic acid. No. 1,945,963. W. E. Baier & R. E. Harris, to Cal. Fruit Growers' Exch, Los Angeles

Oxidation of mononuclar aromatic hydrocarbons. No. 1,945,354. A. O, Jaeger, to Selden Co., Pittsburgh.

For production of purified cinchophen. No. 1,945,270. W. H. Glahn and J. Ehrlich to Verona Chem. Co., North Newark, N. J.

For photochemical oxidation of organic and inorganic compounds. No. 1, 945,067. F. Nozicka, to Firm Heller & Co., Vienna.

Toluene oxidation to produce benzoic acid and benzoates. No. 1,945,032. J. E. Demant, to Bozel Maletra Ste Indus. et Chim., Cuise Lamotte, Fr.

Processes for mfr. and purification of aromatic alcohols. Nos. 1,944,958-9. L. Valik & Irene Valik, Charleston, W. Va.

Process for aromatic sulphodihalogenamides. No. 1,944,568. Hans Mirau, to Chem. Fabr. von Heyden, Radebeul, Ger.

Cholesterin esters from chaulmoogric and hydnocarpic acids. No. 1,944,542. M. Bockmuhl & R. Knoll, Ger., to Winthrop Chem. Co, N. Y. City.

Iodine recovery; adsorbing from brine on charcoal, then subjecting to acid reducing agent. No. 1,944,423. C. W. Girvin, to Gen. Salt Co., Long Beach, Calif.

Compounds derivative from chelidamic acid. No. 1,944,412. M. Dohrn & P. Diedrich, to Schering-Kahlbaum, A.G., Berlin.

Antiseptic and germicide of ortho-cyclohexylphenol. No. 1,942,801. E. C. Britton, to Dow Chem. Co., Midland, Mich.

White needle-like crystals of sodium para-phenylphenate. No. 1,942,800 E. C. Britton, to Dow Chem. Co., Midland, Mich.

Process for gluconic acid and its lactones. No. 1,942,660. R. Pasternack & W. R. Giles, to Chas. Pfizer & Co., Brooklyn, N. Y.

Recovery of alkaloids from cocoa products. No. 1,942,160. Bebie, Livingston & Luthie, to Monsanto Chem. Co., St. Louis.

Photographic material with layer of gelatin product and a dialdehyde. No. 1,941,852. J. Brunken, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Aluminum Spatulas

Aluminum has re-entered the laboratory via the spatula according to *The Laboratory*, Fisher Scientific Co., which reports that "a certain new aluminum alloy is very hard and has the 'springy' quality necessary to make spatulas. This material made into a spatula shows some interesting properties. It, of course, will not rust; it is light in weight; it is non-magnetic; it can be used where contact of iron with the sample is undesirable."

Solvents

It is important to know the limiting proportions between which acetone-air mixtures are inflammable. An investigation to determine this and other important points was recently undertaken by the Bureau of Mines, in cooperation with Western Electric.

Lower limit or inflammability at laboratory temperatures and pressures was found with mixtures containing on an average 2.55% of acetone. This value was found to be reduced as the temperature was increased. At 95° C. it became 2.32%; at 150° C. it was found to be 2.20%; and at 175° C. slightly less—namely, 2.17%. Above this temperature results were found to be erratic because of catalytic oxidation of the mixture, odors of aldehydes being found. Upper limit of inflammability was found to be 12.80% at laboratory temperatures, and as the temperature was increased, the upper limit increased. It became 12.85% at 95° C., 12.95% at 150° C., and 13.40% at 230° C. Again, at the higher values consistent results were difficult to obtain, due to oxidation or decomposition. Water vapor was found to increase the lower limit of inflammability, but only slightly.

Comparable results were obtained in a cellulose-acetate wire-coating machine. When the flame was propagated downwards, limits were found to be higher than when the mixtures were ignited at the middle, or at the bottom of the plant. Results obtained under the last condition were the lowest; and when the temperatures were 95° C. or more, all mixtures caused fires in the dope pot, but in no respect were these true explosions. Apart from cases in which a flame of some size was used for ignition purposes, the method of ignition was found to have no appreciable effect on the lower limit of inflammability. In addition to the inflammability of mixtures, it is useful to know the composition of the acetone-air mixtures developing maximum pressures, as well as the magnitude of the pressure rise. Results of tests showed that maximum pressures were developed when the concentration of acetone was between 5% and 6%. The value decreased as the initial temperature increased. While the maximum pressure obtained was 78 lb. per sq. inch at laboratory temperature, it became 68 lb. per sq. inch at 95° C. and 62 lb. per sq. inch at 150° C. Comparing flame propagation, it was found that acetone-air mixtures are more hazardous than methane-air mixtures, and less so than manufactured gas-air mixtures. Explosives Properties of Acetone-air mixtures, U. S. Dept. of Commerce, Tech. Paper No. 544.

Patents—Industrial Chemicals

Method for purifying air and liberating oxygen. No. 1,946,460. E. Herzog, to Deutsche G. und S. S. v. Roessler, Frankfort.

Potentially reactive phenol-formaldehyde synthetic resin. No. 1,946,459. F. S. Granger, to Combustion Util. Corp., N. Y.

Propionic acid from fermentation of fructose-containing mashes. No. 1,946,447. H. R. Stiles, Terre Haute.

Gas and organic liquid process for recovery of carboxylic organic acid. No. 1,946,419. J. C. Woodruff & G. Bloomfield, to Commercial Solvents Corp., Terre Haute, Ind.

Processes for separating nitroglycerine from residual acids. Nos. 1,946,414-5. Adm. Arnold Schmid, to K. Schmid, Mannheim.

Nitrocellulose and a plasticizer as surface coating for tracing paper. No. 1,946,338. H. M. Sperlin, Kenvil, to Hercules Powder Co., Wilmington, Del.

Textile dressing, sizing and softening oil, on base of soya bean phosphatide. No. 1,946,332. B. Rewald, to Hanseatische Muhl. A-G, Hamburg.

Hydrocarbon oil and rosin impregnation for insulation of cable. No. 1,946,322. G. F. Kennedy, to Hercules Powder Co., Wilmington, Del.

Non-alkaline cleaning composition. No. 1,946,272. R. H. Brownlee, Pittsburgh.

Methyl amine from dimethyl ether. No. 1,946,245. L. C. Swallen, to Commercial Solvents Corp., Terre Haute, Ind.

Neutral reaction product of ethylene glycol and phthalic anhydride. No. 1,946,202. C. L. Gabriel & L. C. Swallen, to Commercial Solvent Corp., Terre Haute, Ind.

Modified liquid quarternary ammonium salt solution holding proteins. No. 1,946,159. C. Graenacher, to Ste. Chem. Ind., Basel, Sw.

Chromic acid and silicate solutions in protecting aluminum from corrosion. Nos. 1,946,151-2-3. J. D. Edwards, to Alum. Co. of America, Pittsburgh.

Use of acid solutions etc. in aluminum oxide coating. Nos. 1,946,148 and 150. M. Tosterud, to Alum. Co. of America, Pittsburgh.

Pervious and adsorbent oxide coating for aluminum and its alloys. No. 1, 946,147. H. Bengstons, to Aluminum Colors Inc., Indianapolis, Ind.

Sodium silicate-chromic acid solution for insulating sheets in elec. apparatus. No. 1,946,146. G. C. Kiefer & C. A. Scharschu, to Allegheny Steel Co., Pa.

Neutral adsorbent for decolorizing veg. oils and organic oils and fats. No. 1,946,124. D. S. Belden & W. Kelley, to Filtrol Co. of Cal., Los Angeles.

Comminuted graphite in carbon tetrachloride for die lubricant, magnesium base alloys. No. 1,946,121. R. T. Wood, to Magnesium Dev. Corp., Ohio.

Catalysts of high mechanical stability, and solid sulfur immune. Of aluminum powder and metal. Nos. 1,946,108-9. M. Pier & K. Winkler, Ger., to Standard-I. G. Co., Linden, N. J.

Sulfur trioxide, phosphoric acid, water-soluble borate, et al agents in treatment of hydrocarbon oils. Nos. 1,946,094-5-6. J. C. Morrell & G. Egloff, to Universal Oil Prod. Co., Chicago.

Anhydrous sodium sulfide, granular. No. 1,946,089 H. H. Mayers, to Rohm & Haas, Phila.

Alkylolamine derivatives of aliphatic acids. Nos. 1,946,079-80. J. G. Kern & C. J. Sala, to duPont & Co., Wilmington, Del.

M'fr, structure and preparation of coating pigments; water-repellant, of soya bean oil, etc. Nos. 1,946,052-3-4-5. J. T. Baldwin, West Chester, Pa., to Sandura Co., Inc., Paulsboro, N. J.

Production water-soluble phosphate compounds from water-ins. calcium phosphate. No. 1,945,914. E. Reubke, Ger., to I.G., Frankfort, Ger.

Process for stable bleaching powder. No. 1,945,913. A. Remele, to I.G., Frankfort, Ger.

Process of making gels from solid reagents mixed in dry powder form. No. 1,945,838. Wm. Vaughan, to Permutit Co., N. Y. City.

Method for metal contact-layers in oxidizing process for sulfuric acid. No. 1,945,811. A. O. Jaeger to Selden Co. Pittsburgh.

Cement; 5% latex, equal parts of chlorinated naphthalene and ester gum. No. 1,945,803. M. E. Delaney, Bloomfield, to Halowax Corp., N. Y. City.

Vehicle with insulating walls, as chemical container. No. 1,945,689. E. A. Hults, to Mathieson Alkali Wks., Saltville, W. Va.

Solutions of barium sulfide and zinc sulfate, in m'fr of pigments by wet-precipitation. No. 1,945,551. W. C. Hooey & E. J. Flynn, to N. J. Zinc Co., N. Y. City.

Fluid pressure apparatus fluid, of castor oil or rapeseed oil or liquid petrolatum—all in mixture with oxygenated by-products of carbon methanol. No. 1,945,543. A. G. Weber & R. B. Schnider, to duPont & Co., Wilmington, Del.

Separating borneol from pine oil, by hydriodic acid. No. 1,945,501. I. W. Humphrey, to Hercules Powder Co., Wilmington, Del.

Liquefaction and rectification process of separating krypton and xenon from air. Nos. 1,945,365-6. W. Dennis, to Air Reduction Co., N. Y. City.

Nitrolactose with explosive and oxidizing salts, for blasting. No. 1,945,344. W. de C. Crater, to Hercules Powder Co., Wilmington, Del.

Ammonium thiocyanate and formaldehyde condensation product. No. 1, 945,315. R. A. Jacobson, to duPont & Co., Wilmington, Del.

Thermo-pressure production of urea. No. 1,945,314. M. Hofsasz, to De Bataafsche Petr., Maatsch., The Hague, Holland.

For dehydrorotenone; hydrogenation with nickel catalyst. No. 1,945,312. H. L. J. Haller & P. S. Schaffer, Wash., D. C., to free use of the public.

Cellulose esters, acylating agent in presence of anhydrous hydrohalogen acid. No. 1,945,310. R. E. Fothergill & F. C. Hahn, to duPont & Co., Wilmington, Del.

Coating from interpolymerization of ester of olefine dicarboxylic acid, and vinyl esters and styrene. No. 1,945,307. H. B. Dykstra, to duPont & Co., Wilmington, Del.

Contact sulfuric acid process. No. 1,945,267. F. P. Fiedler & A. O. Jaeger, to Selden Co., Pittsburgh.

Composition for metallurgical operation, of alkali metal chlorate, a boron, sodium carbonate and manganese dioxide. No. 1,945,260. Estate Alfred H. Davies, N. Y. City.

Separation of organic dibasic acids. No. 1,945,246. H. W. Witzel, to Selden Co., Pittsburgh.

M'fr of alkoxy derivatives of phosphorous acid chlorides. No. 1,945,183. E. Clemmensen, to Monsanto Chem. Co., St. Louis.

Purification of crude coumarin. Nos. 1,945,182-184. E. Clemmensen, to Monsanto Chem. Co., St. Louis.

Continuous ester process, from organic carboxylic acid, water and their ester, and alcohol. No. 1,945,177. Carswell, Stehlby & Alozerij, to Monsanto Chem. Co., St. Louis.

Purification of succinic acid. No. 1,945,175. J. A. Bertsch & A. H. Krause, to Monsanto Chem. Co., St. Louis.

Sludge acid-bauxite process for aluminum sulfate. Nos. 1,945,171-2. W. S. Wilson, to Merrimac Chem. Co., Boston.

Pure hydrogen sulfide from gaseous mixtures. No. 1,945,163. L. Rosenstein & G. A. Kramer, to Shell Dev. Co., San Francisco, Calif.

Acetone from ethyl alcohol. No. 1,945,131. Bloomfield, Swallen & Crawford, to Commercial Solvents Corp., Terre Haute, Ind.

Wood pulp under soda lye and carbon bisulfide, to m'fr nitrocellulose. No. 1,945,101. E. Tschudin Reinach/Basel, Switzerland.

Glazing composition of eleven elements, for direct use on metal. No. 1,944, 938. C. J. Kinzie, to Titanium Alloy Co., N. Y. City.

Nitrocellulose explosive with less than usual of dope ingredients, for dynamite. No. 1,944,910. C. A. Woodbury, to duPont & Co., Wilmington, Del.

Absorbent felt for artificial leather product. No. 1,944,906. G. L. Schwartz, to duPont & Co., Wilmington, Del.

Cellulose ethers for low viscosity solutions. No. 1,944,896. A. S. Levesley and F. C. Randall, Scotland, to Imp. Chem. Ind., England.

Esters and method of preparation. No. 1,944,887. G. DeWitt Graves, to duPont & Co., Wilmington, Del.

Thiourea-formaldehyde resin solution and methylene hardening agent. No. 1,944,867. J. H. Schmidt, & R. S. Daniels, to Bakelite Corp., N. Y. City.

Stoddard solvent base, and carbon tetrachloride, dichloroethyl ether, tetrachlorethane, as dry cleaning composition. No. 1,944,859. S. Born, Tulsa, Okla.

Condensation prods. of alpha-ethyl hexene aldehyde and primary amines. No. 1,944,843. H. A. Morton, Akron, O.

M'fr of ethyl chloride from refinery gas. No. 1,944,839. E. B. Hjerpe & W. A. Gruse, to Gulf Ref. Co., Pittsburgh.

Chlorine water treatment. Nos. 1,944,803-4. George Ornstein, Berlin, Ger.

Ferrous sulfate and borax solutions for treatment of raw shale roofing. No. 1,944,800. E. H. Nichols, Hagerstown, Md.

Sulfur to generate lead sulfide, to form corrosion preventive for electric cables. No. 1,944,778. Henri Benit, to Cie Gen. D'Electricite, Paris, France.

Oxidation control of sea-water bromine by chlorine to liberate free halogen. No. 1,944,738. J. J. Grebe & R. H. Boundy, to Dow Chem. Co., Midland, Mich.

Hydrogen, methyl, phenyl compounds. Nos. 1,944,731-2. O. Diels & K. Alder, Kiel, to I. G., Frankfort, Ger.

Dielectric material, chlorinated benzene base. No. 1,944,730. F. M. Clark, to Gen. Elec. Co., Schnectady, N. Y.

Purifying process for caustic soda solutions. No. 1,944,630. H. Bender, Cal., to Pennsylvania Salt Manufacturing Co., Philadelphia.

To m'fr boric acid free from sulfate. No. 1,944,598. E. Franke, to Chem. Fabr. Landshoff & Myer, Berlin.

Phosphoric acid esters, hardly inflammable and agents for gelatinizing cellulose esters and ethers. No. 1,944,530. C. Schonburg, to I. G. Frankfort, Ger.

Acylated cyclohexyl-phenyl-amines. No. 1,944,514. G. Kalischer & R. Fleischhauer, Ger., to Gen. Anil. Wks, N. Y. City.

Sulfuric acid dissolution of copper, for copper sulfate in solution. No. 1,944, 444. D. W. Marsh & B. H. Marsh, Oakland, Calif.

Carbon dioxide treatment of compounds, for zinc carbonate. No. 1,944,415. M. J. Engberg, Highland Park, Ill.

For obtaining secondary alcohols from acid liquors. No. 1,944,400. B. T. Brooks, Greenwich, Conn., to Standard Alcohol Co., Del.

Acetylene-hydrochloric acid process for trichloroethane. No. 1,944,306. J. Soll, to I. G. Frankfort, Ger.

Process for bleaching powder. No. 1,944,301. A. Remele, to I. G. Frankfort, Ger.

Photo-sensitive element, of a colloid and solution yielding carboxyl and ferric ions. No. 1,944,293. Michele Martinez, London, England.

Production of barium hydroxide and zinc sulfide. No. 1,944,281. T. G. Stephens, Cleveland.

Olefine oxide-alkyl ester, with product reacted by hydrogen halide. No. 1, 944,274. P. L. Salzberg, to duPont & Co., Wilmington, Del.

Hydrogenated methyl abietate. No. 1,944,241. I. W. Humphrey, to Hercules Powder Co., Wilmington, Del.

Sodium et al process for alloy in m'fr of tetraethyl lead. No. 1,944,167. Calcott, Parmelee and Meschter, to duPont & Co., Wilmington, Del.

Zinc oxide from by-product zinc residues. No. 1,944,158. R. W. French, to Superior Zinc Corp., Phila.

Production of diolefines from butylene glycol. No. 1,944,153. M. Muller-Conradi, to I. G., Frankfort, Ger.

Reissue; method and apparatus for concentrating sulfuric acid. No. 19,064. W. C. Mast, Cal., to Chem. Constr. Corp., Del.

Distillation, by-product recovery of tar acid production from carbonization plants. Nos. 1,944,129-31. S. P. Miller, Englewood, to Barrett Co., N. Y. City.

For the production of acetone. No. 1,944,109. K. Roka, to Deutsche G. und S. S. v. Roessler, Frankfort, Ger.

Making phosphoric acid from raw phosphates. No. 1,944,048. Walker, Marshall & Dunn, to So. Mineral Prod. Corp., N. Y. City.

Resinous oil-soluble phenol-aldehyde condensation products. No. 1,944,016. F. Seebach, Ger., to Bakelite Gess., Berlin, Ger.

Method for granular calcium phosphate. No. 1,943,919. W. H. Knox, Jr., Nashville, to Victor Chem. Wks., Chicago.

Hypohalite and peroxide oxidizing agents, in purification of organic acids. No. 1,943,892. A. O. Jaeger, to Selden Co., Pittsburgh.

Removal of mercaptans from hydrocarbons. No. 1,943,744. L. Rosenstein, San Francisco, Calif.

Di-chloroamine sterilization of water. No. 1,943,550. J. C. Baker & F. C. Schmelkes, to Wallace & Tiernan, Belleville, N. J.

Portland cement—acid salt—an alkali silicate method for synthetic in organic gel. No. 1,943,532. C. S. Howe, to Los Angeles Testing Lab.

Non-gel fabric cleaner; bentonite and soda ash. No. 1,943,519. P. S. Denning, Joliet, to F. E. Schundler & Co., Joliet; and Wyodak Chem. Co., Cleveland, Ohio.

Priming composition, lead salt of 3-5 di-nitrocresol. No. 1,943,513. Willi Brun, to Remington Arms Co., Conn.

The production of finely divided calcium sulfate. No. 1,943,497. F. von Bichowsky, Glendale, Calif.

Anhydrous ammonia and chlorine sterilization of water. No. 1,943,487. E. D. Ruth, Lancaster, to H. J. Pardee, Long Island City, N. Y.

Wax emulsion coating for natural food protective. No. 1,943,468. W. A. Bridgeman & J. A. Schade to Wilbur White Chem. Co., Oswego, N. Y.

Dilute acid method of reducing viscosity of a cellulose ether. No. 1,943,461. D. Traill & A. S. Levesley, to Imp. Chem. Ind., England.

Organic acids from aliphatic compounds by separating soap solution and unsaponifiable portion. No. 1,943,427. Franzen, Beller & Luther, to I. G., Frankfort, Ger.

Propellant explosive, using tin-carbon link. No. 1,943,421. Robert Burns & O. W. Stickland, to Imp. Chem. Ind., England.

Production of acetic acid and acetaldehyde from acetylene. No. 1,943,385. W. Heckel & P. Nashan, to Firm Gutehoffnungshutte, Ger.

Recovery of ammonia from paper cook liquor. No. 1,943,345. R. W. Richardson, to duPont & Co., Wilmington, Del.

Chem-metallurgical patents; Nos. 1,943,330 to 1,943,341. All Thomas A. Mitchell, to Lafayette M. Hughes, Denver, Col. Of special interest—No. 330—leaching apparatus for intertreatment of liquids and solids; 331—Use of alkaline earth-metal sulfate in roasting; 332—Chloridizing ores by ferric chloride; 335-7—Chloridizing sulfide ores.; 339—Recovery of silver by desulfurizing complex ores; 340—Recovery of zinc in sulfuric acid leaching process on roasted ores.

Sulfonating fats and oils by chlorosulfonic acid with anhydrides and chlorides of lower fatty acids. No. 1,943,319. R. Huttenlocher, to firm Carl Flesch Jr., Frankfort, Ger.

Chemical hold-over solution for refrigerating by using plurality of liquids. No. 1,943,268. J. Fleischer, to Frigidaire Corp., Dayton, Ohio.

Finely divided soap and pyrophyllite as toilet soap powder. No. 1,943,253. W. H. Alton, to R. T. Vanderbilt Co., N. Y. City.

For preparing tetrazoles disubstituted from use of radicals phenyl, aliphatic or methylene. No. 1,943,148. G. Scheuing & B. Walach, Ger., to E. Bilhuber Inc., Jersey City, N. J.

Electric insulation for magnetic bodies, using clay, magnesia, sodium silicate. No. 1,943,115. W. C. Ellis, to Bell Tel. Labs., N. Y. City.

Optical glass using titanium oxide to obviate tarnishing. No. 1,943,051. E. Berger, to Jenaer Glaswerk Schott, Ger.

For production of nitropentaerythrite, tetranitromethylaniline, trinitroresorcine, and similar. No. 1,943,031. J. Meissner, Burbach, Ger.

Coating composition of nitrocellulose and chlorinated diphenyl. No. 1,942, 926. R. L. Jenkins, to Swann Research, Birmingham, Ala.

For the production of nitrate and recovery of nitric acid. No. 1,942,886. B. Uebler, Berlin, Ger.

Moisture proof match composition, using binder of nitrocellulose and a resin. No. 1,942,866. S. H. Ledin, Sto kholm, Sweden.

Azodyestuff containing a nitrosogroup, claret to garnet. No. 1,942,865. Lasker, Zitscher, Christ & Petzold, to Gen. Aniline Wks., N. Y. City.

Cellulose organic ester with ester of dibromo succinic acid. No. 1,942,844. H. B. Smith, to Eastman Kodak Co., Rochester, N. Y.

Composition from cellulose organic ester and dibutyl malate as plasticizer No. 1,942,843. H. B. Smith to Eastman Kodak Co., Rochester, N. Y.

Recovery of amines and phenols from aqueous solutions. No. 1,942,838. W. L. Semon, to B. F. Goodrich Co., N. Y. City.

Synthetic wax preparations, ester of montanol with palmitic and linoleic acid. No. 1,942,833. Wm. Pungs & M. Jahstorfer, to I. G., Frankfort, Ger.

The separation of ortho-and para-halobenzoic acids. No. 1,942,826. L. E. Mills, to Dow Chem. Co., Midland, Mich.

Production of organic bodies from stearic glycol. No. 1,942,812. F. Guenther & K. Saftien, to I. G. Frankfort, Ger.

Ammonium hydroxide-aluminum sulfate method for making a negatively charged aluminum gel. No. 1,942,799. P. H. Brewer & H. R. Kraybill, to Purdue Research F'nd'n, West Lafayette, Ind.

Vulcanization accelerator. No. 1,942,790. E. Zaucker, X. M. Bogemann & L. Orthner, to I. G. Frankfort, Ger.

Castor oil derivative drying oil. No. 1,942,778. H. J. Schiffler, Dusseldorf, Ger.

Halogen derivatives of isodibenzopyrenequinones. No. 1,942,761. M. A. Kunz & K. Koeberle, Ger. to Gen. Aniline W'ks, N. Y. City.

Aluminum stearate in low pour-point engine lubricant. No. 1,942,636. H. T. Bennett & L. G. Story, to Mid-Continent Petr. Corp., Tulsa, Okla.

Process for water soluble metal carbamates. No. 1,942,610. R. B. MacMullin, to Mathieson Alkali Wks., N. Y. City.

Sodium stearate soap solution, with fat and cresol for waterproofing stuccoed surfaces. No. 1,942,601. W. B. Houston, Alhambra, Calif.

Sulfuric acid ester of fatty acid compounds of high molecular weight. No. 1,942,578. H. Siebenburger to Soc. of Chem. Ind., Basel, Switzerland.

Chlorine reactions for m'fg starches, dextrines and gums. No. 1,942,544. A. D. Fuller, to Nat. Adhesives Corp., N. Y. City.

Toxic inorganic salt with oleaginous agent adsorbed, as larvicive. No. 1,942,532. J. C. Munday, N. Y. City.

Vinyl ester and styrene, with rosin, polymerized to a compound. No. 1,942,531. H. J. Barrett, to duPont & Co., Wilmington, Del.

For the manufacture of oxygenated organic compounds, with metal catalyst. No. 1,942,530. Walter Bader & E. B. Thomas, England, to Celanese Corp., Del.

Ammonium acetate in alcohol for fabric delustering. No. 1,942,523. C. R. Weiss & W. R. Bennett, Indianapolis, Ind.

The preparation of sols for concentrating substances in suspension or emulsion. No. 1,942,507. C. Q. McW. Campbell, Shamokin, Pa.

Reacting in presence of anhydrous aluminum chloride, in making acyl-benzoic acid. No. 1,942,430. B. H. Jacobson, to Calco Chem. Co., Bound Brook, N. J.

Heating molten phthalic anhydride, water and acatalyst, in process for benzoic acid. Nos. 1,942,389-90. Courtney Conover, to Monsanto Chem. Co., St. Louis.

For the production of diphenyl mono-sulfonic acid. No. 1,942,386. W. C. Stoesser & R. F. Marschner to Dow Chem. Co., Midland, Mich.

Concentrated alkali-metal silicate solution as adhesive and film forming composition. No. 1,942,299. P. C. Lemmerman & W. K. Schweitzer, to Grasselli Co., Cleveland, Ohio.

Variation in solution used in patent No. 1,942,160. No. 1,942,177. M. Luthy, to Monsanto Chem. Co., St. Louis.

Carbon tetrachloride extraction of rotenone in plants. No. 1,942,104. H. A. Jones, Washington, D. C., to free use of Gov't and people.

Lamp coating of sodium silicate, a filler, hydrated chromic oxide and boric acid. No. 1,941,990. A. F. Lindstrom, to Westinghouse Co., Pittsburgh.

Solid agglutinant, of acetyl cellulose, collodion and ethyl acetanilid. No. 1,941,959. W. Stelkens & R. Muller, to C. F. Boehringer & Soehne, Mannheim, Ger.

Step in separation of acetic acid from acetic acid anhydride. No. 1,941,951. Muhler, Hatzig & Rabald, to C. F. Boehringer & Soehne, Mannheim, Ger.

Use of oxidizing agents in production of dibenzanthrone by alkali fusion process. No. 1,941,771. H. J. West, to Selden Co., Pittsburgh.

In processes of refrigeration with solid carbon dioxide. No. 1,941,744. F. Heywood, to Imp. Chem. Ind., England.

Motor fuel with high % unsat. compounds, and succinimide as gum inhibitor. No. 1,941,689. A. P. Jaeger, to Selden Co., Pittsburgh.

Catalytic oxidation of organic compounds. No. 1,941,688. A. O. Jaeger, to Selden Research & Eng. Corp., Pittsburgh.

The manufacture of ether derivatives of I-benzyl-3-methyl-isoquinoline. No. 1,941,647. Otto Wolfes, Darmstadt, Ger.

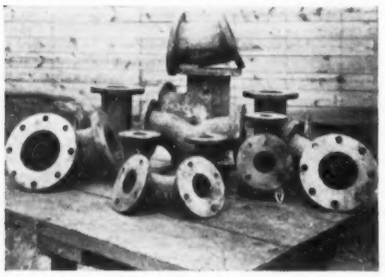
Method of forming aliphatic ketones fom unsaturated fatty acids. No. 1, 941,640. D. K. Tressler to Mathieson Alkali Wks., N. Y. City.

Sulfuric acid treatment of unsaturated ketones, forming waxlike substances. No. 1,941,639. D. K. Tressler & C. Schade to Mathieson Alkali Wks., N. Y. City.

Separation of oil and wax mixtures by nitrobenzene. No. 1,941,601. S. W. Ferris, to Atlantic Ref. Co., Philadelphia, Pa.

New Equipment

Many varying factors and the difficulty of satisfying the different operating conditions in the wide and complex field of chemical industries have required the development of several separate and distinct alloys by the National Alloy Steel Co., a subsidiary of Blaw Knox, Pittsburgh, Pa. A few of these follow.



Group of various joints and elbows made of several new alloys, each of which has been designed to meet certain types of corrosion in the handling of chemicals.

NA-1 is recommended for use in contact with such corrosive media as sulfuric and sulfurous acid, ammonium nitrate and coal mine waters. Specifically, in such applications as sulfite paper mills, for rabble arms in metal roasting furnaces, for digester parts and for equipment in cracking oil. NA-2 is suitable for use in enameling racks, tube supports and other places where it will come in contact with alkalies at high temperatures. NA-4 will meet the requirements of canneries, dairies, oil refineries or other plants where the alloy will be required to resist acetic, citric, lactic, hydrocyanic, oxalic and tartaric acids, salt brine and hot oils. NA-19 may be used for service in connection with mixed nitric and sulfuric acids, sulfur gases at high temperatures, molten copper, etc.

Equipment Booklets

E84. Anchor Cap & Closure Corp., Long Island City. New booklet describes in detail Anchor molded caps—an exceedingly valuable booklet.

E85. The Chemical Rubber Co., West 112 th st., and Locust ave., Cleveland. New leaflet describes the Ohaus improved Harvard trip scale.

E86. Carbondale Machine Co., Carbondale, Pa. Carbondale has two new booklets. First: pertains to the new Carbondale System of liquidfying the CO_2 gas after it is reclaimed from brewery fermenters—either open or closed. The plant operates automatically, which includes ridding itself of the excess air and water that may be carried over with the gas. It does not require frequent inspection or manual adjustments. Second bulletin pertains to the Carbondale System for collecting and storing CO_2 gas under pressure. This system is suitable for any brewery requiring the recovery of only enough gas for carbonating and processing its own products. The gas after leaving the fermenting tank passes through a foam removing tank and then into and through a 2-stage compressor. After compression the gas passes through a washer which cleans it thoroughly before it is admitted into the storage tanks. From the storage tanks the compressed gas, under 250 lbs. pressure, goes to the carbonating system.

E87. J. L. Ferguson & Co., (Packomatic packaging machinery) Joliet, Ill. Company has just issued a new folder which contains a series of interesting booklets describing a number of packaging installations and the special types of machines adaptable for each particular job.

E88. General Electric Co., Schenectady, N. Y. New 4-page booklet describes indoor oil circuit breakers, Types FK-232 and FKR-232.

E89. Charles Hamann, Port Chester, N. Y. New booklet describes in detail the various types of bottle washing machines manufactured. Copy should be in the hands of every chemical specialty producer where washing bottles is a factory operation.

E90. Hauser-Stander Tank Co., Cincinnati, Catalog 33 contains 100 pages of descriptive matter, profusely illustrated, showing the complete line of wooden tanks produced. Useful data are included.

E91. Kent Machine Works, 37 Gold st., N. Y. City. Four page illustrated leaflet describes roller mills, stone mills, mixers, and small batch and laboratory units manufactured by this company.

E92. N. J. Zinc Co., 160 Front st., N. Y. City. D. L. Colwell describes "Tough, Strong, Permanent Die Castings" (reprinted from Metal Progress) in a new company release.

E93. Orville Simpson Co., 1230 Knowlton st., Cincinnati, Catlog 33 describes the complete line of Rotex screens. Specially well illustrated. Plant managers will find the booklet a useful addition to their "Five-Foot Shelf" of catalogs.

E94. Oakite Products, Inc., 22 Thames st., N. Y. City. *Oakite News Service* for January and February features among other articles "Proved Methods of Preparing Surfaces for Repainting Compared."

E95. The Pfaudler Co., 89 East ave., Rochester, N. Y. Company has assembled in catalog No. 714 descriptive material of all glass lined equipment suitable for the pharmaceutical, cosmetic, rayon, petroleum, sugar and mild chemical industries.

E96. Pneumatic Scale Corp., 59 Newport ave., Quincy, Mass. New booklet adequately describes a straight-away hook-up of cleaning and filling, capping, labeling, cartoning equipment that offers exceptional economical advantages.

E97. Quigley Co., 56 W. 45 st., N. Y. City. New booklet introduces Triple-A No. 44 Black Anti-Corrosive Vehicle for Aluminum. Plant managers will find the booklet instructive.

E98. Raymond Bros. Impact Pulverizer Co., 1302 N. Branch st., Chicago. Latest booklet —"Raymond Review" for 1933 details the various improvements made in the past year in pulverizing and drying problems.

E99. Raymond Bros. Impact Pulverizer Co., A new booklet gives complete technical data on Raymond screen mills.

E100. Roots-Connersville Blower Corp., Connorsville, Ind. Bulletin 60°B10 is descriptive of Roots-Connersville cycloidal rotary pumps, built on the 2-impeller principle, with 2 and 3-lobe impellers, depending upon the type of service to which they are applied.

E101. Joseph T. Ryerson & Son, 16th and Rockwell sts., Chicago. This well-known supply house has just issued its 1934 catalog. Should be on every plant manager's and purchasing agent's desk for ready reference.

E102. Stonhard Co., Philadelphia, Pa. New 24-page booklet of special value to those with plant maintenance responsibilities. Describes how a handy man can repair holes, ruts and breaks and lengthen and waterproof floors in plants.

E103. Surface Combustion Corp., Toledo, Ohio. Latest 4-page leaflet describes how old heat treating furnaces may be brought up-to-date effecting really worthwhile economies. Actual examples are cited.

E104. Synthane Corp., Oaks, Pa. New 4-page leaflet gives instructions for machining laminated Bakelite in chart form for ready reference.

E105. Synthane Corp. New booklet describes properties and machining instructions on silent stabilized gear material (Synthane laminated Bakelite).

E106. A new 40-page illustrated booklet has been prepared by the Advertising Committee, subsidiary manufacturing companies of the U. S. Steel Corp., on stainless and heat resisting alloy steels. This very complete treatise gives the physical and chemical properties, uses, and other important technical data on the various types of such steels and is a valuable contribution to the literature. Plant managers, consultants and others dealing in equipment problems will find it most useful. Copies are available from any of the subsidiary companies: American Sheet and Tin Plate, Pittsburgh, American Steel & Wire, Chicago, Carnegie Steel, Pittsburgh, Illinois Steel, Chicago, National Tube, Pittsburgh.

E107. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. "Engineering Achievements of 1933" proves heartening reading in these times.

E108. Worthington Pump & Machinery Corp., Harrison, N. J. Four page booklet reports on Type UB, Two-Stage Volute Worthington centrifugal pumps and gives complete engineering data.

Chemical Industries,
25 Spruce Street,
New York City.

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Equip. March

Chemical Markets & News

Chemical Alliance Code Signed — Gen. Johnson Announces "Merit Clause" Will Be Stricken Out—George H. Mead Is Appointed Administration Member.

The Chemical Alliance Code, revised again and again in the past six months, finally reached President Roosevelt's desk on Feb. 3. On Feb. 10 the basic code of the chemical industry received presidential blessing and after 10 days of grace became effective Feb. 20. Within 48 hours after the President had signed the code the entire situation was badly muddled with labor protesting against the inclusion of the so-called controversal "merit clause" and General Johnson insisting that he had signed the code and forwarded it to the President while under the impression that the clause had been deleted from the final draft. Said the NRA administrator in a formal statement:

"As this code was reported originally by former Division Administrator Williams, it contained the so-called merit clause. I returned it to the division in order to have this clause eliminated. Subsequently a report was made by Division Administrator Berry that the merit clause had been eliminated and that the Article IX in its present form does not violate the established policy of the administration."

Apparently through error of transcription or interpretation, the code as resubmitted by Major Berry under the above report is still objectionable and Article IX violates the established policy. Therefore, it will be eliminated."

As Yet No Executive Order

The procedure required to eliminate Article IX is the issuance of an executive order. Todate no such order has been issued. It is possible that some compromise may be worked out. Practically all leading chemical executives were in Washington during the week of March 5 attending the general NRA code authorities meetings. The draft finally signed by President Roosevelt was actually the sixth revision of the original wording. It differed but slightly from the fifth. The concluding sentence in Article IX reads as follows: "Therefore conscious of the great purpose of the industry, by presenting this code the employers in this industry shall not be deemed to have waived any of their constitutional and legal rights to engage, promote, or release employees, and the members of the industry shall not be deemed to have waived any other constitutional rights."

Controversy first rose over the so-called "Merit Clause" after its inclusion in the code for the automotive industry. No objections were raised by labor at the time of the hearings, but after the code had been duly signed labor suddenly entered such violent protest that General Johnson announced that no further codes would be signed which contained such a clause. Chemical executives have maintained for months that because of the very peculiar character of the industry that the inclusion of the clause was a vital necessity.

Right of employers to hire and retain their workers on the basis of individual merit was upheld by President Roosevelt specifically in a letter written to General Johnson. The President wrote at that time:

"Following our recent discussion of various misunderstandings and interpretations of Section 7-A of the National Industrial Recovery Act, I wish to advise you of my position.

"Because it is evident that the insertion of any interpretation of Section 7-A in a code of fair competition leads only to further controversy and confusion, no such interpretation shall be incorporated in any code. While there is nothing in the provisions of Section 7-A to interfere with the bona-fide exercise of the right of an employer to select, retain or advance employees on the basis of individual merit, Section 7-A does clearly prohibit the pretended exercise of this right by an employer simply as a device for compelling employes to refrain from exercising the rights of self organization, designation of representatives and collective bargaining, which are guaranteed to all employes in said Section 7-A."

Code Administrators

Code provides for an average maximum workweek of 40 hours, and a basic minimum wage of 35c an hour in the South and 40c elsewhere. Code will be administered by the Executive Committee of the Alliance with Cyanamid's William B Bell as chairman. Others include Mathieson's E. M. Allen, Merrimac's Charles Belknap, A. A. C.'s Horace Bowker, Barrett's E. W. Clark, Williard H. Dow, Lammot duPont, U. S. I.'s Glenn Haskell, George W. Merck, Calco's August Merz, Carbide's J. W. McLaughlin, duPont's A. E. Picher, Commercial Solvent's W. D. Ticknor.

Mead—of the Mead Paper Co.

NRA Release No. 3416 issued Feb. 21 cryptically states: National Recovery Administrator Hugh S. Johnson today announced the appointment of George H. Mead, of New York, president of Mead Paper Company, to be an administration member of the Chemical Industry Code Authority. To which most members of the industry immediately asked, "Who is Mr. Mead?" But any paper man will testify that George H. Mead is the man who single-handed has made the manufacture of bookpaper profitable not only to himself but to others as well.

George Houk Mead was born in Dayton Nov. 5. 1877, the son of Harry Elbridge and Marianna Phillips (Houk) Mead, and was educated at Hobart College and M. I. T. He was employed successively

The Month Reviewed

Feb.

10. President Roosevelt signs Alliance Code (241).

17. Johnson repudiates merit clause (241). Carbon Black Code signed (249).

21. George H. Mead appointed on Alliance Code (241).

27. Freeport Sulphur ships first tonnage for Grand Ecaille (248).

March

5. President Roosevelt asks for trade tariff powers (246).

5. Code Authorities meet in Washington (246).

7. Monsanto earnings best in history (267).

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INTERMEDIATES

by the Cellulose Products Co., of Boston, Mead Paper Co., of Chillicothe, Ohio, and General Artificial Silk Co. In '05 he organized Mead Pulp & Paper, now the Mead Corp. In '12 he became president and is now chairman of the board of G. H. Mead Co., Mead Sales Co., Abitibi Power and Paper Co. He is president of Mead Investment Co. and the Mead Securities Co.

"You Chemical fellows are lucky to have the services of George H. Mead."

Between Dayton and Cincinnati lies fertile Miami Valley. In the early part of the last century was founded in this valley the bookpaper industry of this country. One of the pioneers was Colonel Harry E. Mead, father of George H. Mead, who has followed in the footsteps of his father and remained close to Miami Valley and paper. Modest, retiring, and with a distaste for publicity, he found himself with a large bookpaper manufacturing plant on his hands and the industry badly disorganized with cut-throat competition. Manufacturers were distrustful and fearful of one another. He jumped into a fierce battle and against tremendous odds finally won a signal victory. As chairman of the executive committee of the Bookpapers Manufacturers' Association he has brought to an end chaotic conditions that were leading the industry to the brink of destruction. By his charm, by his persuasiveness, by his strict fairness, he has time and again "smoothed the troubled waters." He does not believe in "railroading" legislation, and chemical executives will find him sympathetic and full of understanding of their problems.

In 1914 Mr. Mead married Miss Elsie Louise Talbott. They have 5 children—2 boys and 3 girls. Mr. Mead's brother-in-law, Harold E. Talbott, is connected as director with a host of important corporations including the International Chromium Process Corp., and Thomas & Hockwalt Laboratories, of Dayton. Mr. Mead is an outstanding polo player and on his beautiful estate at Aiken, S.C., maintains a string of highly prized ponies. Next to polo he likes golf best and consistent'y goes around in 80 or better.

A Republican all his life, George H. Mead has given wholeheartedly of his time and ability to furthering the aims of the NRA, believing that the cooperative spirit will solve most of the difficulties that lie so heavily upon us at the moment. He has served on the Industrial Advisory Board. General Johnson's plan calls for assigning administration members to code authorities from various industries other than the one in which the member is commercially active. Hence a paper man on the chemical code authority. To which each paper man interviewed for comment added "You chemical fellows are indeed mighty lucky to have the services of George H. Mead."

Obituaries

Dr. Ernest Cadgene, 54, founder and president, Lyons Piece Dye, Paterson, died Feb. 4. Fred C. Acker, president, National Chemical, Cleveland, died suddenly on Feb. 1 following a heart attack. Dr. William R. Cathcart, 65, Corn Products' technical director, died suddenly on Feb. 10 while on a visit to Asheville, N. C. Thornton H. Bissell, 45, International Nickel advertising manager since '22, died Feb. 18 of a heart attack. Orton G. Dale, consulting engineer associated with Texas Gulf Sulphur, was drowned near his summer home at Bayhead, N. J., on Feb. 18.

Thomas V. Sullivan, 53, president, Federal Color Laboratories, died Feb. 25. W. D. Mount, 67, chemical consultant and for years in charge of Mathieson's Saltville plant died Feb. 28 at his home in Lynchburg, Va.

N. J. As a Chemical Producer

As a new chapter in its series of industrial exhibits, Newark Museum (Newark, N. J.) has in preparation an exhibit for the layman which will be known as "Chemistry Changes Our World: An Exhibit of the New Discoveries for Industry and the Home." This is in furtherance of the Museum's policy of presenting exhibits related to the industries of its community, but because of the scope and timeliness of the Chemistry Exhibit, it is expected to attract national interest.

Already more than 100 national firms have accepted invitation to cooperate in the exhibit, which will open about the middle of March. Among the 1st to offer cooperation were E. I. Du Pont, Celanese, Bakelite, Beetleware, E. R. Squibb and Sons, Celluloid, Westinghouse Electric, Public Service Electric and Gas, Texas Gulf Sulphur, and others. Among Those

Rutgers' chemistry dean—William T. Read.

who have offered to act in an advisory capacity to the exhibit, are Dr. E. C. Worden of the Worden Laboratories, Professor William T. Read of Rutgers, Dr. John H. Schmidt, Chairman of the North Jersey Section of the American Chemical Society, and Donald Deskey, decorator, of New York City.*

Chemistry and Libraries

Special Libraries Association announces formation of a "Chemical Division" within their Science and Technology group. Aim is: to bring in closer contact those librarians, whose work deals mainly with chemistry and allied subjects; to facilitate inter-library loans; to exchange duplicate material; etc. A constructive program will be worked out with the cooperation of all chemical librarians in the U. S and Canada. A monthly bulletin will bring to members a symposium on methods, shortcuts in library practice and many valuable suggestions. Anybody interested in this project is asked to get in contact with Mrs. Jolan M. Fertig, Librarian, Westinghouse Research Laboratories, East Pittsburgh, Pa.

Quotations

Dr. Charles L. Reese, retired duPont research director and A. C. S. president: The Society has passed through 4 years of serious financial depression with flying colors. We go forward into the next year with confidence.

Alcan Hirsch, former U. S. S. R. chief chemical consultant, before the new School for Social Research: There are 3 basic reasons why I believe in the ultimate success of the Soviet system. "First, they are educating the masses, and have already raised the literacy level 90% among their people between the ages of 10 and 90. Second, they are sincerely trying to raise the standard of living of all the people. And, third, science occupies a pre-eminent position in that country.

*Included in the list of exhibits to be shown are the 300 new chemicals produced by advertisers in CHEMICAL INDUSTRIES and PLASTIC PRODUCTS which attracted such wide attention at the recent Chemical Exposition. New Jersey's production of chemicals is second only to that of N. Y. State and it is the state's most important industry. Williams Haynes, publisher of CHEMICAL INDUSTRIES and PLASTIC PRODUCTS has written a special brochure relating the importance of New Jersey in the field of industrial chemistry specially for the exhibit. Exhibit opens March 20.

Association News

Lewis H. Marks, former Industrial Alcohol Institute secretary and now head of Philadelphia whiskey producing company, has been renominated for the presidency of the Chemists (N. Y.) Club. His services to the club have been many and perhaps his chairmanship of the renovating committee is best known and appreciated by the club members.

The busiest N. Y.-Philadelphia commuter—Lewis H. Marks.

Baldwin Also Re-Nominated

Nominations for the 3 vice-presidencies: Columbia's distinguished Marston T. Bogert, Randolph T. Major, and Victor G. Bloede. Robert T. Baldwin is again renominated for the treasurership. Nominated for 3-year trusteeships: William B. Thom and Arthur E. Wells. Committee included Chairman T. B. Wagner, Harold Ahlquist, Lester S. Bacharach (who has just recently formed Empire Distilling), C. R. DeLong, Harry Farleigh, E. D. Kingsley and Nelson Little. Alternates were: L. W. Bass, L. A. Belding and C. W. Fairbank.

N. Y. Drug Club Elects

Mallinckrodt's Wasserscheidt is Drug and Chemical (N. Y.) Club's new vice-president, Pfizer's Teeter is treasurer, and N. Y. Quinine's McDonough is secretary.*

Company News

Commercial Solvents is shutting down Terre Haute plant (producing grain alcohol 1,250,000 gals. monthly), but is speeding up production at Peoria. Terre Haute plant may be converted into a whiskey distillery. Swann has adopted a 36-hour week for 650 operatives. Paterson, N. J. warehouse of Warwick Chemical is now located at new and larger quarters at 190 16th ave. American Catalin is now located at 1 Park ave., N. Y. City. American Mineral Spirits has opened a Cincinnati office at 310 Southern Ohio Bank Bldg., in charge of E. M. Toby, Jr., formerly in charge of the Atlanta office.

Hochstadter Laboratories have moved to the 12th floor of 254 W. 31st., N. Y. City. Barclay Chemical is also in new quarters at 75 Varick st., U. S. I. has sold its interest in Penn.-Maryland to National Distillers. U. S. I. receives in exchange for its 50% interest 138,000 shares of Distillers worth approximately $4,150,000. Charles S. Munson and Charles E. Adams have been added to Distillers' board.

Darco Sales formerly located at 45 E. 42 st., is now occupying new quarters on the 14 floor in the Lincoln Bldg., 60 E. 42 st. Move was necessitated by the need of more commodious offices to handle Company's growing business. Darco has pioneered many new developments in uses for its activated carbons in diversified fields, and the history of its success is a striking tribute to the painstaking research and persistent effort, which have characterized the Darco organization since its inception, to extend the application of its products.

Dow (N. Y.) Goes RCA

Dow Chemical's N. Y. City office after April 1 will be in the RCA Bldg., Rockefeller Center. Cyanamid is also moving into the same building about April 16.

Stauffer Chemical's N.Y. City office has been moved to larger quarters in the Graybar Bldg., (2710).

Wilson & Bennett, steel container manufacturer, has acquired a plant at Jersey City.

*President of the club is an insurance company executive. Club is located in the heart of N. Y City's insurance district and has a large membership in the insurance field.

Personnel

J. Tenney Mason is now assistant to the president of U. S. I. All of the company's activities in the molasses business will be under the supervision of Mr. Mason who is now in Cuba inspecting properties. Mr. Mason, a Swarthmore graduate, joins U. S. I. after serving over 18 years with DuPont. Mr. Mason will have his headquarters in the executive offices in the Lincoln Bldg., N. Y. City.

Patterson Foundry Appoints

Patterson Foundry & Machine, East Liverpool, Ohio, has engaged C. V. Murray. Mr. Murray is well-known to the trade, having served the N. Y. territory for over 13 years as sales engineer for Robinson Manufacturing, Muncy, Pa. He will make his address at 30 Church st., N. Y. City.

Additional Changes

Everett Chapman, who joined Lukenweld, Inc., division of Lukens Steel, early in '30 as director of engineering and research, has been elected vice-president. Mark Bitterson, former sales manager, General Chemical, is now assistant general manager. Edward Carpenter, former assistant sales manager, is now in charge of the sales department.

George Barsky and Ernest D. Wilson, both formerly with Cyanamid, have formed Barksy and Wilson, chemists and chemical engineers, at 521 5 ave., N. Y. City. Both are PhD's, the former was in charge of Cyanamid's research and the latter directed fumigation sales. Dr.

COMING EVENTS

American Management Association. 4th Annual Packaging Exposition, Hotel Astor, N. Y. City, March 13-17.

Fashion Group, "Fashions and Interior Decorations Developed in Man-Made Materials, 30 Rockefeller Plaza, Rockefeller Center, March 15-April 14.

Oil Trades Association of N. Y., Annual Meeting, Waldorf, N. Y. City, March 20, 7 p. m.

American Association of Petroleum Geologists, 19th Annual Meeting, Baker Hotel, Dallas, March 22-24.

A. C. S. 87th Meeting, St. Petersburg, Fla., Hotel Vinoy Park, week of March 25.

Third Technical & Chemical International Congress of Agricultural Industries, Paris, week of March 26.

Industrial Arts Exposition, National Alliance of Art and Industry, 30 Rockefeller Plaza, Rockefeller Center, April 1-30.

Canadian Institute of Mining & Metallurgy, annual meeting, Quebec City, April 3-5.

American Drug Mfrs. Association, Greenbrier, White Sulphur Springs, week of April 16.

Knitting Arts Exhibition, Commercial Museum, Phila., Apr. 23-27.

Electrochemical Society & American Ceramic Society, joint meeting, Asheville, N. C. April 26-28.

U. S. Chamber of Commerce, Washington, May 1-4.

A. C. S. 12th Midwest Regional Meeting, Hotel Muehlebach, Kansas City, Mo., May 3-5.

Fourth Annual National Premium Exposition and Convention, Palmer House, Chicago, May 7-11. A. B. Coffman, Exp., Mgr., 35 East Wacker Drive, Chicago.

Tanners' Council of America, Spring Meeting, Greenbrier, White Sulphur Springs, W. Va., May 10-11.

American Institute of Chemical Engineers, tentative, Waldorf Astoria, N. Y. City, May 14-21.

National Fire Protection Association, Atlantic City, May 14-18.

Achema VII Exhibition of Chemical Apparatus & Plant, Cologne, Germany, May 18-27.

American Petroleum Institute, mid-year meeting, Pittsburgh, William Penn Hotel, May 22-24.

Canadian Chemical Association, Royal York Hotel, Toronto, June 4-6.

Cottonseed Products Association, New Orleans, June 4-5.

American Association of Cereal Chemists, Royal York Hotel, Toronto, June 4-7.

Ninth International Congress of Pure & Applied Science, Madrid, Spain, June 10-17.

National Association of Insecticide & Disinfectant Mfrs., Inc., Chicago, June 11-12.

Eleventh Colloid Symposium, Madison, Wis., June 14-16.

National Fertilizer Association, 34th convention. White Sulphur Springs, June 18-20.

National Association of Purchasing Agents, Cleveland, June 18-21.

American Society of Refrigerating Engineers, semi-annual meeting, Skytop, Pa., June 21-22.

A. S. T. M. Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, June 25-29.

Technical Association of the Pulp & Paper Industry fall meeting, Portland, Ore., Aug. 28-31.

American Gas Association Convention and Exhibition, Atlantic City, Week of Oct. 29.

National Paint, Varnish & Lacquer Association, Annual Convention, Washington, fall of the year, date to be announced.

LOCAL

American Institute of Chemists, N. Y. Section, Chemists' Club, March 16.

American Society of Refrigerating Engineers N. Y. Section, March 22.

Wilson was with Guarantee Exterminating for a time and previous to his Cyanamid connection was with Gratton & Knight (leather).

O. H. Osenkop, associated with Coignet Chemical Products for 25 years previous to its merger with International Selling, has been made general sales manager for the combined organizations. Clever, well-liked Thomas D. Darlington, Hercules' News Bureau director, has resigned to return to the Coast and expects to devote considerable time to the study of international problems pertaining to the Pacific Coast area. Out of Stanford but 9 years he has made to date a most notable record.

D. W Haering & Co. (Chicago water treatment specialist) has added Edwin H. Chandler in Rhode Island and Albert Nickerson, Albert Stewart, and C. W. MacKinnon in Massachusetts. At the annual J. T. Baker Chemical directors' meeting on Feb. 16 all present officers were re-elected. Winthrop M. Crane, Jr. is a new Air Reduction director. Stanley Clark, former Lehn & Fink sales manager, is now with National Oil Products.

Personal

Henry Lorenz, Cyanamid's export dept., was married Feb. 3. George W. Harris, President, Potash Co. of America, is in Honolulu recovering from a severe influenza attack. George W. Merck and his family are at Hobe Sound, Fla. Harold J. Rolls (Rolls Chemical, Buffalo) and Mrs. Rolls are in Bermuda for the balance of the winter. A. Olivier, N. Y. City representative, Produits Chimiques du Limbourg, S. A., sailed March 8 for an extensive European trip. Natural Products Refining's vice-president, Stanley Weil, returned early in February from a 21 day West Indies cruise.

Horace Bowker is in the South and may go to Cuba. He plans to return March 19. Universal Oil Products' research director, Dr. Gustav Egloff, has been elected chairman of the Chicago section of the American Institute of Mining and Metallurgical Engineers. Dow's N. Y. manager, Ralph E. Dorland, and Mrs. Dorland vacationed in Miami.

H. G. Jennison, president, The Jennison-Wright Co., Toledo, (manufacturer of Klearit activated carbons) is in California on a combined business and pleasure trip. With Joseph Turner back from his Long Key Fishing camp Walter Merrill has taken up the quest for sword fish. Corning Glass' research director (also president, American Ceramic Society) is now a Kentucky Colonel. Philadelphia Quartz's vice-president and chemical director has been active recently in addressing several A.C.S. sections on "Soluble Silicates." Charles Lawrence Riker, member of the old firm of J. L. & D. S. Riker, chemical merchants (Joseph Turner changed the firm's name when he bought controlling interest) left an estate appraised at $3,492,937 gross and $3,259,124 net. Mr. Riker died in June, '32. Selina S. Riker, widow, is chief beneficiary.

General Dyestuff's Harold A. Sweet discussed "Detergents—Old and New" before the N. Y. Section, A.A.T.C. & C. on Feb. 23. Cyanamid's Dr. Walter S. Landis spoke on the future of the chemical industry at the 27th Pratt Alumni dinner. Columbia's Harold C. Urey has been awarded the Willard Gibbs Medal (Chicago A. C. S. section) for his discovery of "heavy water. Forty-one years old he is the youngest man ever to receive the honor. "Larry" Swenson's first public appearance following his recent serious illness was at the Chemists' Club on Feb. 24 when he was inducted into the office of President of the Salesmen's Association. He still looks a bit "shaky" but promised "LaGuardia" activity in pushing new projects. Florence Wall, publicity writer and former editor of *The Chemist*, spoke on "Fifty Years of Paraphenylene-diamine" before the Technical Association of the Fur Industry on Feb. 19.

Litigation

John Hall, Jr., a chemist formerly employed by Carbide and Carbon Chemicals cannot dispose nor use certain secret chemical processes or other data, according to an injunction granted on petition of the company by Judge George W. McClintoc, of Charleston, W. Va. It is alleged in the petition filed by the company that Hall has declined to return blue prints, photographs, photostats and other data.

Customs and Tariffs

Secretary of the Treasury, Henry Morgenthau, has declined to issue a finding of dumping in connection with imports of titanium white dioxide from Germany. Customs officials have been instructed to proceed with appraisement of shipments on which no action has been taken while the probe of dumping complaints was under way.

Customs Decisions

L. A. Solomon & Bro., New Orleans.—Fullers earth, activated by a purification process with hydrochloric acid, is held more specifically provided for at $3.20 a ton, as claimed under paragraph 207 of the tariff, then at 1c per lb. and 30% as assessed. Product in question is found to be manufactured fullers earth rather than earth artificially activated.

New Construction

Sherwin-Williams is adding to its lake C red toner plant at Chicago. Abbott Laboratories has purchased a building in Atlanta for southeastern headquarters. Canadian Industries is planning on a $900,000 caustic and chlorine plant at Cornwall, Ont. Industrial Rayon is said to be contemplating erection of a new plant at Utica. DuPont plans addition to the Waynesboro Acele (acetate) yarn plant. Du Pont has ordered construction of 200 dwellings at Old Hickory, Tenn. Freeport Sulphur is constructing 76 dwellings at its new plant at Grande Porte, La.

Sessions-Gifford (Providence heavy chemical and textile chemical supply house) is now using recently completed warehouse at 255-261 Allens ave. Spencer Kellogg will erect grain storage addition to the Superior, Wis., plant ($200,000). McCullough-Robinson, Lansing, Mich., are reported contemplating a Milwaukee laboratory. American Zirconium, Baltimore, is reported ready to proceed with a $500,000 plant. Jackson Fertilizer (Jackson, Miss.) will rebuild plant recently burned.

International Agricultural Chemical is reported ready to construct a fertilizer plant at East Macon, Ga. Richmond Guano, Richmond, Va., is rebuilding plant recently destroyed by fire. B. W. Norton Mfg., 3098 10 st., Oakland, Calif., is about ready to build a new lacquer plant.

Capital Industry Business

Interesting statistics have just been released by the Federal Trade Commission in connection with its supervision of the Securities Act of '33. For the 3 months ending December, '33 a net total of $149,443,574 is estimated as derived from the sale of securities. For new company plant construction, machinery and equipment $7,474,673 or 5% of the total is estimated. For old company plant and equipment, additions, betterments, development and construction the figure is $9,048,716 or 6.1% of the total.

Latest advances in eye protection for oxy-acetylene welding and cutting have been embodied in new Oxweld No. 15 welding spectacles and a new lens, Type AA, announced by Linde Air Products, 30 East 42 st., N. Y. City.

A new all-purpose aluminum welding flux, Oxweld Aluminum Flux, is also announced by same company. This new flux is intended to replace two fluxes previously marketed, one for welding pure aluminum and the other for welding aluminum alloys.

Washington

Tariff changes are always of special interest to the chemical industry. Hence leading executives of the industry are finding much to consider in the revolutionary proposal of President Roosevelt requesting unlimited powers in the matter of raising or lowering rates as much as 50%. So confident is the administration of the passage of the proposed legislation that Richard Washburn Child has been designated as emissary to go to Europe for conferences abroad. With government now so emmeshed in industry fear is expressed in many quarters that the present regimentation of the latter may lead to the ultimate sacrifice of a number of important industry groups on the altar of the "New Deal" and international economic theories. In the closing months of '32 and the first few months of '33 chemical industry was deeply concerned with the entrance of large quantities of sulfate of ammonia, superphosphate, and other important items at prices so low as to lead to the charge of dumping in many cases. Those countries which were off the gold standard and who had depreciated their currencies were able to offer price advantages both in this country and in others in which American goods were competing. When we went off the gold standard, thereby depreciating the dollar, this situation was largely remedied without legislation.

How About Chemicals?

Leading spokesmen for the chemical industry strenuously opposed the idea of the Hull tariff pacts when first advanced early in '33. Stand then taken by such executives as Harry L. Derby, of Cyanamid, opposed placing such unlimited power in the hands of the President. In April of '33 CHEMICAL MARKETS (now CHEMICAL INDUSTRIES) quoted Mr. Derby as follows: "While we have at the moment in the White House a man of high integrity, a man whom the people have complete confidence in his fairness and distinterestedness, what assurances have we that this will always be so? Why change to a new untried revolutionary policy when we already have ample facilities in the present Tariff Commission and the flexible clauses of the present tariff measure to correct any real unfairness in the rate structure."

Newest proposal or more correctly, a a revival of a former proposal, of the administration on tariffs has been temporarily overshadowed in Washington because of the meeting of code authorities, but it is expected that the proposal which practically permits the President to write his own tariff "ticket" for the next 3 years will be vehemently opposed by a number of large groups in very immediate future.

NRA Takes Stock

Three day meeting of 3,863 NRA code authorities (on March 5-7) in Washington, called together to "air" grievances and to consider suggestions for improving the operation of codes was climaxed by the personal appearance of the President in a stirring appeal for further reduction of hours and an increase in wages to aid in reducing the still large unemployment total, which, with the imminent disbandonment of the CWA on May 1, is bound to be still greater.

In the meantime the 30-hour work week bill was reported favorably by the House Labor Committee. However, with very little indication that the measure has the real support of the administration, and is, indeed, considered by General Johnson as to unflexible and arbitrary as to be sound and workable, possibility of its passage is remote. In some quarters it is looked upon as an administration gesture to win support for further voluntary cuts in hours and higher wages. General Johnson is said to look with favor upon a 10% cut in present work-week hours and a 10% increase in wages.*

Ethyl Alcohol Production

A. A. A. will not renew temporary permits issued Jan. 15 for a 45 day period permitting unlimited ethyl alcohol production from commodities other than cereal grains. Reports indicate that amount produced did not greatly exceed quantity which would have been permitted under the famous 10% clause which was bitterly protested by synthetic and molasses alcohol producers, and finally temporarily abandoned when the federal alcohol control administrator insisted that a shortage impended. Applications for further production for beverage purposes are now being received. New label requirements of the Federal Alcohol Control Board requires whiskey with neutral spirits must show whether or not the source of such spirits was from grain. This is expected to discourage use of alcohol not made from cereal grains.

Pittsburgh Business Good

Pittsburgh Plate Glass' president, H. S. Wherrett, reports safety glass (Duplate) division 1 of the most active. Plant capacity was increased 60% last fall and operations are now on a 3 8-hour shifts. Paint, brush, and chemical divisions anticipate heavy spring business. Richard K. Mellon succeeds the late R. B. Mellon as a director.

Safety Glass News

Engineers of the Union Pacific and the Burlington, both of which are building the newest type of high-speed trains capable of 110 miles per hour, have chosen Duplate safety glass for both trains.

Libbey-Owens-Ford Glass, Toledo, is expecting to benefit materially this year by the increased use of safety glass. This will be due to new laws becoming effective in several states requiring its use and the '34 specifications of additional cars calling for its use. A survey made by the company shows that 20% of the cars made in '33 used safety glass, while laws in several states will cause 35% of all cars to use it in '34 and 65% in '35.

Ceramic Notes

A N. Y. Ceramic Industries Association has been formed. Dean M. E. Holmes, N. Y. State College of Ceramics, Alfred, is secretary-treasurer. Dept. of Ceramic Engineering, Illinois, Urbana, is planning short courses on 1. Bodies and glazes; 2. Enamels; 3. Structural clay bodies. Applications welcomed. Ceramic clay prices have been advanced $1 a ton.

Employment Rises

Chemical factory employment showed an increase of 0.7% between Dec. 15, and Jan. 15. Volume was 30.3% above that in the corresponding month in '33. Payroll totals in factories in the chemical group of industries decreased 0.3% during the period and stood 29.4% above the '33 level. For detailed indices see pg. 271.†

Liquor Bottle Top Market

According to *Modern Packaging*, screw-caps for liquor bottles are going to be 3 types, molded plastic, double shell metal, and single shell metal. And, they prophesy, molded caps will enjoy the greatest sales volume.

Chemical Patents—How Many?

Chemical patents issued in principal countries of the world in '33 totaled 28,051, a record figure, according to Prof. E. J. Crane, Ohio State, editor of "Chemical Abstracts." "The '33 volume of 'Chemical Abstracts' ", Prof. Crane said, "contains 64,190 abstracts, a gain of 6,109 over '32, biggest year heretofore.

Metal Beer Container

Firestone Steel Products (Firestone Tire & Rubber subsidiary) is producing a new beer barrel designed to resist extreme pressures and temperatures, and to give the utmost in sanitation. Barrel is made of double walls of steel, outer wall of heavy gauge carbon steel, corrugated for strength, and in inner shell of smooth stainless steel. No pitch is necessary.

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*Refractories industry is the first to accept Johnson plea with a 36-hour week and 10% pay raise.

†N. Y. State factory job gain set a 14-year mark. State increase reached 23.8% for January and February. Payrolls rose 35.1%.

Foreign

Of historic importance is the start of construction of I. C. I.'s great £2,500,000 hydrogenation project at Billingham-on-Tees for the production of gasoline from bituminous coal. Sheffield steel producers received orders for highly specialized alloy steel last September and such marvelous progress has already been made that it is quite likely that the plant will be opened 18 months ahead of the scheduled time. It is hoped that hydrogenated gasoline will be on the British market before the end of '34. First plant will supply but 100,000 tons annually, a very small portion of the England's gasoline requirements (See CHEMICAL MARKETS, Aug, '33, p. 150).

Petroleum Times (British) briefly described the process as follows:

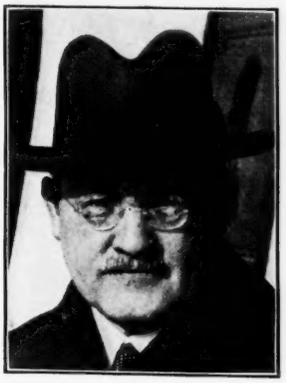
Bituminous coal consists of 75 to 85 parts carbon, 5 parts hydrogen and the remainder mainly sulfur, nitrogen and oxygen (calculated ash free), while (gasoline) consists of approximately 88 parts carbon, 12 parts hydrogen, and practically no other elements. To achieve conversion from one to the other hydrogenation has to effect the three following chemical processes: (1) Break up the large complex molecule of coal; (2) remove the sulfur, nitrogen and oxygen as their "hydrogenated" compounds—hydrogen sulfide, ammonia and water; and (3) increase the hydrogen: carbon ratio of the hydrocarbon remainder from 1:16 to 1:7. Provision must also be made for the physical processes of ash removal and separation of the petrol formed from the gas, petrol refining, etc.

Plant itself will provide for the following main operations. Coal will be cleaned to about 2% ash content, crushed to 60-mesh grade, and mixed into a paste with some of the heavier oils previously formed in the process. This paste, with the appropriate catalyst, will be injected with nearly pure hydrogen into large forged alloy-steel converters under a pressure of about 3,000 lbs./sq. in. Although these forgings themselves will be maintained cool the reaction inside will go on at a temperature of about 400 to 500° C., and occupies quite a considerable time. This will convert the coal into a mixture of oil varying from crude petrol to heavy fuel oil, with a small residue of unconverted solid carbonaceous material and all the coal ash.

After separating out the latter the oils will be distilled into 3 main fractions, heavy oil (B. P. over 300° C.), middle oil (B. P. 200 to 300° C.) and crude petrol. Heavy oil will be put through a 2nd stage similar to the 1st, and will there be converted to more middle oil and petrol, which will again be separated and added to the corresponding products from the 1st stage. Middle oil will then be further hydrogenated in what is known as the vapor stage, requiring for this only a very brief reaction time, catalyst being permanently fixed in the converter.

I. G. Hydrogenation

That Germany will become completely independent of imports of foreign petrol and the heavier fuels is foreshadowed by Dr. Carl Bosch, chairman of the Board of



Dr. Carl Bosch who with fellow Nobel chemistry prize winner, Prof. Bergius, is making Germany independent of outside sources of petroleum production.

the German Dye Trust. Dr. Bosch feels his statement is warranted by recent developments in the extraction of fuel oils from coal on a commercial basis. German chemists are extracting petrol and a large number of heavy and lighter oils from both lignite and anthracite, using a high-pressure form of hydrogenation. By the end of this year, when the process should be in full operation in the Dye Trust plants, it is expected that every 3,500,000 tons of coal will yield 1,000,000 tons of petrol. Sixty % of Germany's petrol consumption could thus be covered by utilizing only 2.3% of the Ruhr coal production.*

Spanish Nitrogen

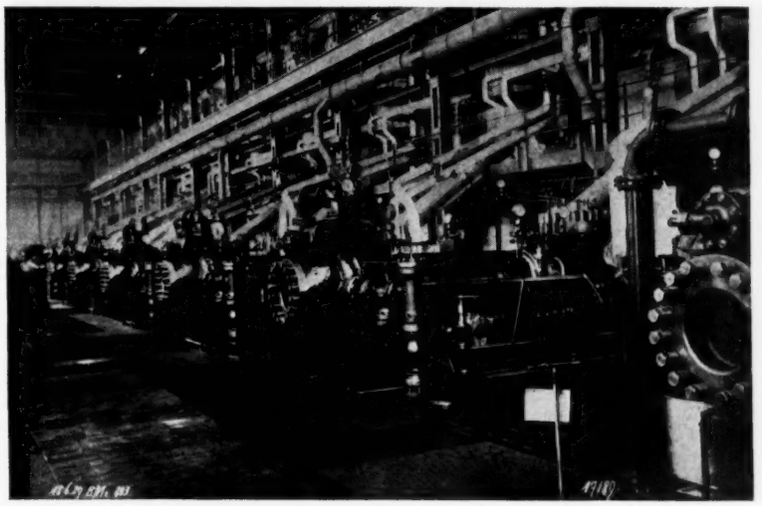
Spanish nitrogen commission report recently made public proposes that State promote nitrogen production in sufficient quantities to supply entire domestic demand. Imports would be subject to control and permits issued only upon presentation of evidence that a proportionate quantity of national products had been previously acquired. Sales prices for imports would include a tax to compensate domestic producers.

Considerable criticism has been raised. Spanish buyers have enjoyed prices lower than those obtained in price-controlled European markets, and new plan contemplates maximum sales price equivalent to 25% over average prices governing in interior of Germany, France and Italy. If plan should become effective, prices of nitrogen to farmers would increase 65%.

Soviet Fertilizer

Soviet nitrogenous fertilizer plant of the huge Bobriky chemical combine, 200 kilometers south of Moscow, started production Dec. 18, '33. Combine includes a powerful electric station, a ceramic combine with a capacity of 51,000 metric tons, a fire brick section with an estimated output of 28,000,000 bricks per year, a chemical combine and several auxiliary enterprises. Power plant under construction in connection with the chemical combine will be the 2nd largest in the Soviet Union. City now containing 12,000 will accommodate 50,000.

So far as the available figures show, French production of crude potash salts last year was rather lower than the 1,891,145 tons of '32, but average content of K_2O rose from 17.77 to 18.21%. Export sales increased during year by 5%, and home market sales by about 2%. Exploitation during the year was confined to the richest deposits and those most easily worked.



Interior of the gigantic Leuna Works of the I. G. Photograph shows a battery of high pressure pumps. German chemists in succession have made their country independent of natural nitrate, camphor, petroleum, and other vital products of industry and war.

*England is not alone in announcing hydrogenation plans. I. G. will employ shortly 10,000 workers when the Leuna works are extended. At present 850 buildings cover 130 acres, but evidently manufacture of synthetic benzine is intended to become the most important operation in which Leuna is to engage, and will in the end completely eclipse enormous nitrate and ammonia activities.

Whelpley in England

Medley G. B. Whelpley, member of the firm of Guggenheim Bros., who sailed recently for England on the Majestic, stated that the purpose of his trip is to discuss with British interests in the nitrate industry question of the reconstruction of the capital structure of the Anglo Chilean Consolidated Nitrate Corp. and of the Lautaro Nitrate Co., Ltd., pursuant to the nitrate reorganization law recently passed in Chile. Mr. Whelpley is president of these 2 companies. Under the new Chile nitrate project, Cosach, the old holding company in which the government had an interest is being liquidated, and Lautaro and Anglo-Chilean are being withdrawn from the combination.

Mr. Whelpley stated that nitrate sales are responding to better worldwide economic conditions and that he is hopeful of a continued upward trend.

Nickel Seeks Concessions

International Nickel is negotiating for nickel deposits at Kaulatunturi, Petsamo, on the Finnish Arctic Coast. Jaffa Orange Products Co-operative Society, Ltd., has been formed to enter the citrus oils field. Haarla, Finland, plans alcohol production from sulfite lye. Important phosphate rock deposits are reported in Austria. German Lampblack Cartel is fixing prices and output. Sulfuric sufficient to produce 80,000 tons of sulfate at Toulouse was made from gypsum.

Japan is using Egyptian salt for alkali. For 1st 6 months of '33 Japan took 85% of a total export of 57,319 tons.

Testing Dead Sea Lease

Validity of concession held by Palestine Potash, Ltd., at the Dead Sea is in question in a suit in which evidence has been taken before the Turkish Commercial Court at Istanbul at the request of the British High Court. Rights of Palestine Potash, Ltd., to extract salts from the Dead Sea are contested by an influential group of capitalists, mainly French. Complications are presented in the action, and points of international interest may develop.

Chemical resources of the Dead Sea, covered by the Palestine Potash concession, have recently been estimated to be worth more than a trillion dollars. Up to the present, the concessionaire has spent about $3,750,000 on equipment and has laid down 600 acres of concrete "pans" for evaporation of the Dead Sea water.*

*As far back as 1840, British Admiralty sent an expedition to investigate Palestine properties. Molineux organized one in 1847, American government one in 1848; well-known geologist, Dr. M. Blankenhorn, undertook, in 1908, a scientific exploration under the auspices of Sultan Abdul Hamid II. All these expeditions had a purely scientific purpose.

According to State geologist S. G. Blake, Dead Sea will in course of time place Palestine in the foremost rank of the potash and bromine producing countries.

Yedogawa Works, Yokohama, has increased its production of formic acid from 50 tons to 150 tons a month. At present monthly export is 20 tons. This is taken principally by the Dutch Indies. A similar development in the manufacture of oxalic acid is projected.

Dutch Phosphate

N. V. Amsterdamsche Superfosfaat Fabriek and N. V. Vereenigde Chemische Fabricken (Dutch superphosphate producers, merged in '33) report that despite the maintaining of export and home market tonnages year's earnings were off due to low prices. Nauru-Ocean Island phosphate trade (under control of the Board of Commissioners) was favorable in the past year according to reports. Egyptian Ministry of Trade is embarking on a superphosphate plant. Country imports 50,000 tons annually.

New Trading Cartel

"Fosfa," Ltd., a chemical trading company, has been organized to replace "Fosfacid" superphosphate cartel in Czechoslovakia. All producers in the country are represented in the new organization. Only change in number of members is a reduction of one due to absorption of Silleiner Kunstdunger & Chemischen Industrie A. G., Sillein, by Aussiger Verein.

Heavy Chemicals

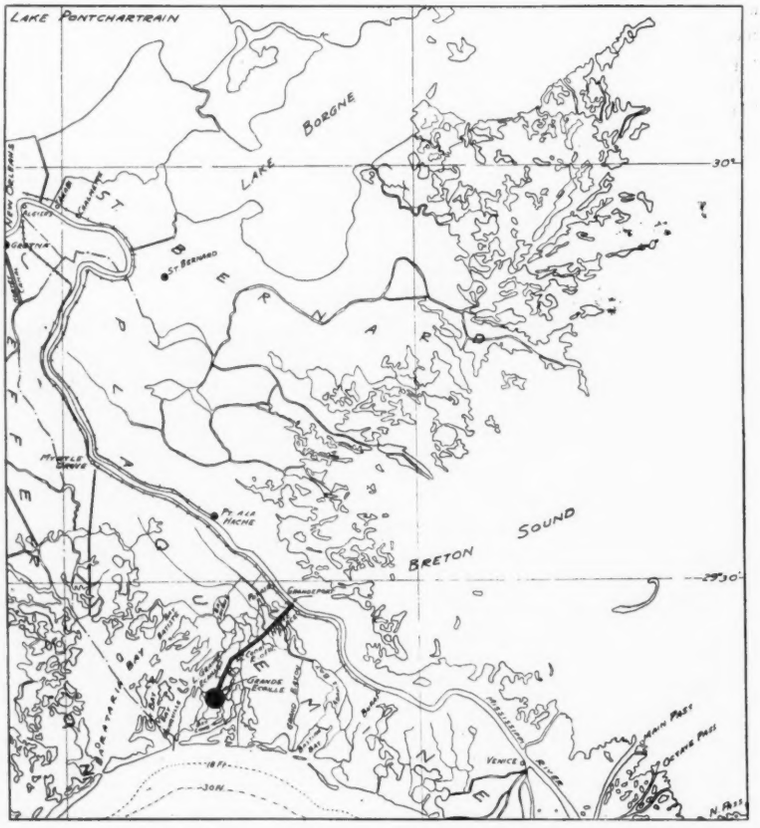
Tonnages Increase

Purchasing expanded along conservative lines during February. In some fields buying was brisk while in others notably the textile, a hesitant note was distinctly apparent. So-called heavy industries, steel, automotive, etc., were calling for larger shipments of industrial chemicals. Outlook for larger tonnages in March is considered good by most of the producers.

Price changes were relatively few. Carbon black, l.c.l. quotations were advanced ½c. Less carlot ammonium phosphate

Important Price Changes

	Feb. 28	Jan. 31
ADVANCED		
Acid abietic	$0.07	$0.06
Ammonium linoleate	.12	.11
Arsenic, red	.14½	.14
Carbon black (l.c.l.)	.07	.06½
Glycerine, dynamite	.11¼	.10¾
Saponification	.08	.06¾
Soap lye	.07¼	.06¾
Magnesium chloride	36.00	34.00
Sodium abietate	.06	.03
Tartar emetic, tech.	.22¾	.21¾
Tin crystals	.38½	.38
tetrachloride	.26	.25½
DECLINED		
Ammonium phosphate (l.c.l.)	$0.10	$0.10½



Last month saw the first shipment of sulfur from Freeport Sulphur's new Louisiana deposits. Some 2,500 tons left for Liverpool, Eng. Map shows the location of the new development. (See CHEMICAL MARKETS, *July '33, p. 19, for a description of the building of the plant).*

prices were reduced ½c, but the carlot quotation remained firm at 8c. All crude grades of glycerine were advanced sharply. The tight position of this commodity was previously reported. Rise in abietic acid and its salts was directly traceable to the spectacular advances in rosin prices in the last 30 days. Tin salts were fractionally higher as the metal quotations advanced.

Grasselli Now Sells—

Arrangements have recently been made whereby all cadmium products of duPont will be manufactured, sold and serviced by Grasselli Chemical. Included therein are all the cadmium products of R. & H. Chemicals Division, namely the CAD-a-LOY process, CAD-a-LOY anodes, cadmium anodes, cadmium metal, cadmium balls, cadmium sticks and cadmium oxide.

These materials are available through branch offices and warehouses and are handled in general in the same manner as other commodities. Orders and inquiries should be sent directly to this or any branch offices.

The technical services available through R. & H. Chemicals Division will be continued by Grasselli. Grasselli is now ready to supply a complete line of plating equipment.

New Quebracho Pool

Proposals for creation of a Paraguayan-Argentine quebracho pool are reported to have been transmitted to the Government of the former by its Ambassador in Washington following conversations he has had with the Ambassador of Argentina.

Fuller's Earth Statistics

U. S. fuller's earth production has increased phenomenally during 38 years for which annual figures are available, declines were registered in '31 and '32. Quantity produced in '32 was 252,902 short tons ($2,440,736), compared with 288,400 tons, ($3,055,570) in '31, a decrease of 12% in total output and 20% in total value. Approximately 95% of all fuller's earth produced in U. S. during past 3 years has been used for decolorizing mineral oils, and 5% in treating vegetable oils and animal fats.

Carbon Black Code Signed

General Johnson signed carbon black code to become effective Feb. 19. Code gives governing authority power to decide upon increases in plant capacity of the industry in any given region at any time such action is considered advisable, subject to approval of the administrator. This power was provided "in the interests of economical use of natural gas and the orderly development of the carbon black industry, NRA officials said.

Work hours are limited to 40 a week in any 6 weeks period, to 48 hours in any one week, and to 8 hours in any one day. Minimum wages for common labor are 40c an hour in Louisiana 50c an hour in Oklahoma and Stephens County, Tex., and 55c an hour elsewhere. A minimum of 40c an hour is provided for office workers.

Average quoted price for sulfur as reported by the trade journals was unchanged at $18 a ton f. o. b. mines throughout the year. Spot prices for car lots were $21 a ton and prices for sulfur exported were given as $22 a ton f. a. s. Atlantic ports.

Fine Chemicals

Prices More Stable

Market for fine chemicals registered steady improvement in the past month. Prices were decidedly more stable, reflecting in the main the more tranquil state of the dollar in foreign exchange.

Outstanding in the price revisions was a sharp advance in mercury to $74-$76 a flask. The strong position in glycerine, commented upon in the last few market reports, culminated in a further rise. Stocks are said to be small and the position of both importers and domestic producers was one of extreme firmness.

Quotations on tartar emetic were revised in the 2nd week of the month. New prices are: 5 bbl. lots, tech., crystals, 22¾c per lb.; smaller lots, 23c; powdered, 22¾c; smaller lots, 23c; U. S. P., powdered, 28-28½c.

Important Price Changes

	Feb. 28	Jan. 31
ADVANCED		
Glycerine, C. P.	$0.12	$0.11
Mercury	74.00	68.00
Silver nitrate	.33⅛	.32¼
Tartar emetic, U.S.P.	.28	.27
DECLINED		
Camphor, slabs	$0.54	$0.55
powder	.54	.55

Platinum in '33

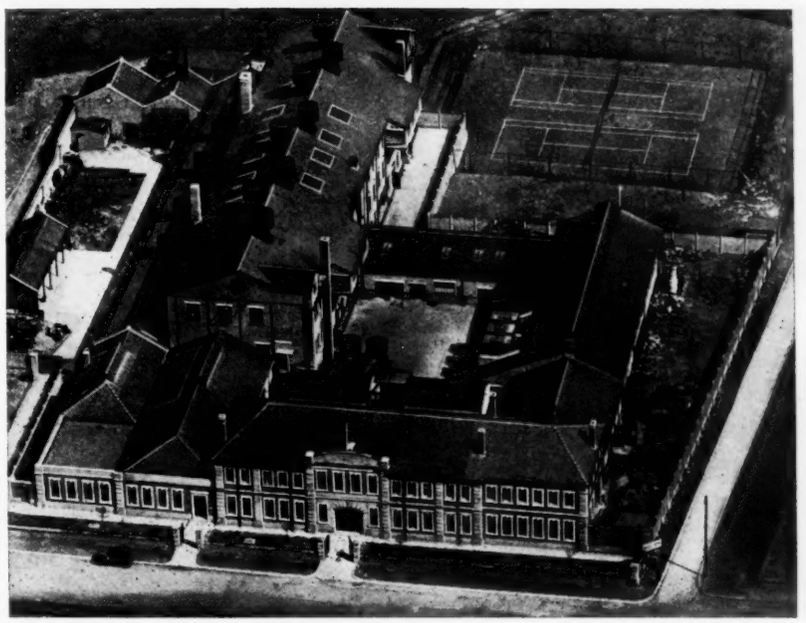
World consumption of platinum metals rose from 75,000 ounces in '32 to conservative estimate of 175,000 ounces in the year just closed. Although accurate data on the Russian situation are not available, it is generally believed that world stocks which tended to accumulate during the depression were somewhat reduced during the past 12 months.

Improvement which the past year brought to the platinum metals may be attributed largely to the increasing problems or gold in industry and the arts, says Paul D. Merica, assistant to the president of International Nickel in his review for the year.

Canada is second to Russia as the world's largest producer of platinum metals and International Nickel is the largest individual producer in the Dominion.

Russell Stoddard, former Ungerer sales manager, and more recently sales manager, Van Ameringen-Haebler, has been appointed representative for W. Benkert & Co. He will specialize on pyrethrum and derris products.

U. S. Pharmacopoeial Vitamin Advisory Board has recommended new vitamin standards for U.S.P.X Cod Liver Oil.



Airplane view of the British Acton platinum refinery, the largest in the world and owned by Mond Nickel Co. Plant is only slightly over two years old. (*See* CHEMICAL MARKETS, *Jan. '32, p. 28*).

Paints, Lacquers and Varnish

Slight Pick-up in Raw Materials

Raw materials for the paint, varnish and lacquer trade were in poor demand in January as consumers generally had built up large inventories at the lower prices prevailing for '33. Some improvement was noted in February and March tonnages are expected to show decided gains. Rumors were in the trade of higher aluminum bronze powder prices when the low-priced metal contracts of most of the producers run out. L.c.l. carbon black prices were advanced ½c, and shipments were said to be larger than current production, permitting improvement in the statistical position. A number of the varnish gums were advanced as spot stocks of same proved inadequate for the improved call for materials. Others were off sharply as demand continued to lag. Higher prices prevailing for quicksilver were speedily reflected in a rise in vermillion. During the 30 day period domestic casein grades lost and then regained a ½c.

Important Price Changes

ADVANCED

	Feb. 28	Jan. 31
Carbon black (l.c.l.)	$0.07	$0.06½
Vermillion, English	1.52	1.41

Solvents in Good Demand

Lacquer raw materials including the solvents were taken in larger quantities. A number of synthetic resin producers revised prices upward. Sales of paints, varnishes and lacquers continue to expand. Further improvement is confidently looked for. Expansion in both public works and private building is indicated and a tremendous back-log of maintenance is likely to break this spring and summer.

An Unusual Code

Carbon black code became effective on February 19. Production control section of the code is an outstanding feature. This vests the governing authority with the power to decide upon increases in plant capacity of the industry in any given region at any time such action is considered advisable, subject to the approval of the Administrator. Such power was given to permit the economical use of natural gas and the orderly development of the industry.

Coolahan Speaks on Tornesit

R. A. Coolahan, of Hercules' cellulose products dept., addressed the Montreal Section of the Society of Chemical Industry on March 7, and on March 16 will address the Toronto Paint and Varnish Production Club. Subject: "Tornesit," a new Hercules product from which protective coatings can be made that are unusually resistant to acids and alkalies. Tornesit also has many other important advantages of interest to chemists and paint and lacquer manufacturers.

Industry Deaths

Jeremiah William Geraty, 69, N. Y. City paint manufacturer, died Feb. 27. Marion A. Riley, Baltimore manager, Eagle Pitcher Lead, died from a stroke on Feb. 25. He was with Eagle Pitcher Lead for over 35 years. Henry S. Ramey, 71, well known in Louisville paint circles for years, died in retirement on Feb. 1.

Hercules' New Rosin

Hercules Powder is marketing "Bresin" a hard, black, tough, non-tacky, oil-resistant resin for use in insulating varnishes, impregnating compositions, lacquers, emulsion paints, and thermoplastics, especially as a raw material for thermoplastics of the phenol-formaldehyde type. It is insoluble in drying oils and most varnish thinners, but is soluble in lacquer solvents. It is said to be harder and tougher than rosin, and is not tacky at normal temperatures. It may be plasticized with castor oil without appreciable effect on its insolubility in petroleum oils.

"Bresin" has good dielectric properties, according to Hercules authorities, and will be useful in many types of insulation and sealing compounds.

New A. S. T. M. Section

A. S. T. M. Committee D-9 on Electrical Insulating Materials has been formed to undertake the development of tests for shellac and synthetic resins when they are used in electrical insulation. New Section will cooperate with Committee D-1

A number of tentative specifications are to be balloted upon by the Society for final adoption as standard. They include: raw tung oil, boiled linseed oil, soluble nitrocellulose, ethyl acetate (85 to 88% grade), normal butyl acetate (88 to 92% grade), butanol (normal butyl alcohol), amyl acetate (synthetic), amyl alcohol (synthetic), butyl propionate (90 to 93% grade), ethyl lactate (synthetic), acetone,

'33 Fourth Quarter Lacquer Sales

	Total sales		Finished lacquer		Lacquer thinners		Dopes*	
1933	*Gallons*	*Dollars*	*Gallons*	*Dollars*	*Gallons*	*Dollars*	*Gallons*	*Dollars*
First quarter	3,905,846	5,323,315	1,916,350	3,668,615	1,765,148	1,401,624	224,348	253,076
Second quarter	5,935,608	8,044,749	2,938,643	5,561,381	2,708,268	2,152,168	288,697	331,200
Third quarter	6,568,896	8,890,314	3,340,182	6,176,543	2,932,826	2,340,847	295,888	372,924
Fourth quarter	4,490,940	6,229,776	2,450,501	4,424,790	1,853,974	1,577,754	186,465	227,232
Totals, year	20,901,290	28,488,154	10,645,676	19,831,329	9,260,216	7,472,393	995,398	1,184,432
1932								
First quarter	4,666,420	6,947,508	2,249,069	4,692,055	2,161,317	1,913,937	256,034	341,516
Second quarter	4,475,293	6,867,544	2,337,612	4,823,513	1,968,189	1,796,301	169,492	247,730
Third quarter	3,578,390	5,382,948	1,778,305	3,593,977	1,601,875	1,515,330	198,210	273,641
Fourth quarter	3,532,718	5,140,226	1,836,432	3,524,739	1,499,002	1,341,175	197,284	274,312
Totals, year	16,252,821	24,338,226	8,201,418	16,634,284	7,230,383	6,566,743	821,020	1,137,199
1931								
First quarter	5,622,337	9,504,887	2,835,390	6,524,744	2,565,008	2,602,506	221,939	377,637
Second quarter	6,712,289	10,966,421	3,265,744	7,399,231	3,153,427	3,038,561	293,118	528,629
Third quarter	5,515,026	8,641,603	2,727,951	5,791,264	2,521,764	2,456,265	265,311	394,074
Fourth quarter	4,586,663	7,223,112	2,352,524	5,012,044	2,030,906	1,902,364	203,233	308,704
Totals, year	22,436,315	36,336,023	11,181,609	24,727,283	10,271,105	9,999,696	983,601	1,609,044

*Does not include base solutions used in the manufacture of lacquers.

'33 Paint, Varnish and Lacquer Sales

Sales of paint, varnish and lacquer products in November totaled $16,234,234 in value, according to monthly report of U. S. Bureau of Census from data supplied by 586 establishments. This compared with $18,944,106 in preceding month and $12,494,818 in November, 1932. January-November sales in '33 were $206,604,923, and sales for the corresponding period of '32 were $193,838,795.

		Classified sales reported by 344 establishments				
		Industrial sales			Trade sales of	
1933	*Total sales reported by 586 establishments*	*Total*	*Paint and varnish*	*Lacquer*	*paint, varnish and varnish*	*Unclassified sales reported by 242 establishments*
1933—Jan.	$11,275,396	$3,529,886	$2,386,947	$1,142,939	$4,168,260	$3,577,250
Feb.	11,665,734	3,423,033	2,445,378	977,655	4,771,706	3,470,995
March	13,578,568	3,391,947	2,484,550	907,397	5,788,213	4,398,408
April	19,043,787	4,677,309	3,143,803	1,533,506	8,582,411	5,784,067
May	26,241,044	5,991,938	4,298,455	1,693,483	11,788,573	8,460,533
June	27,813,233	6,827,509	4,832,551	1,994,958	12,443,998	8,541,726
July	22,090,187	6,406,184	4,493,516	1,912,668	8,627,400	7,056,603
August	20,620,811	6,323,475	4,754,701	1,568,774	7,840,359	6,456,977
Sept.	19,097,803	5,544,686	3,975,917	1,568,769	7,462,113	6,091,004
Oct.	18,944,106	4,949,755	3,721,420	1,228,335	7,376,012	6,618,339
Nov.	16,234,234	4,656,353	3,466,174	1,190,179	6,566,157	5,011,724
Dec.	16,156,062	4,418,023	4,428,376	989,647	6,157,567	5,580,472
Totals	$222,760,965	$60,140,098	$43,431,788	$16,708,310	$91,572,769	$71,048,098
1932—Jan.	15,894,506					
Feb.	16,270,822					
March	19,089,005		Comparable data not available			
April	22,612,193					
May	24,981,441					
June	19,637,358	4,685,399	3,617,719	1,067,680	8,734,330	6,217,629
July	14,430,122	3,793,245	2,900,707	892,538	6,058,813	4,578,064
Aug.	16,032,441	3,851,028	3,057,096	793,932	6,918,659	5,262,754
Sept.	16,805,712	3,980,564	3,113,303	867,261	7,216,748	5,608,400
Oct.	15,592,377	3,996,500	3,036,323	960,177	6,610,011	4,985,866
Nov.	12,492,818	3,599,319	2,639,362	959,957	5,196,766	3,696,733
Dec.	9,484,520	3,222,770	2,186,706	1,036,064	3,506,715	2,755,035
Totals	$203,323,315	.....	.....	.....	.....	.....

dry bleached shellac, orange shellac, pure linseed oil putty for glazing, shellac (testing), lacquer solvents and diluents (testing).

Resin Producers Unite

Synthetic Resin Manufacturers' Association has been formed with R. M. Banks, Cyanamid, as president, Gordon Brown, Bakelite, as vice-president, and A. J. Wittenberg, Stroock & Wittenberg, as secretary and treasurer. Association has not been formed for code purposes but to aid in establishing standards and other constructive work in the varnish resin industry.

Krumbhaar's Tour

Beck, Koller's vice-president in charge of technical development, Dr. William Krumbhaar, spoke before 70 members of the Chicago Paint and Varnish Production Club on Feb. 5 on the processing of fossil copal gums and pointed out the advantages of using the chemically treated product. Dr. Krumbhaar spoke before the Detroit club on Feb. 13 on the same general subject.

Water Soluble Linseed Oil

E. E. Oppenheimer & Co., Newark, has a water soluble linseed oil. As an emulsifier of drying oil it will form stable emulsions with 3 or 4 parts by weight of boiled linseed or tung oil. An emulsion of 2½ parts of boiled oil with 1 part of emulsifier is sufficient to form a complete drying film. Oil is soluble in common solvents like turpentine, amyl acetate, etc. With turpentine, oil exhibits an interesting property for turpentine becomes a thickening agent instead of a thinner. When 3 parts of turpentine and 1 part of water-soluble linseed oil are emulsified very carefully, a creamy thick emulsion is formed which is exceedingly stable and is not broken down with the addition of boiled linseed oil and paint pigments.

Bright Outlook

Evidence that members of the paint, varnish and allied industries will "put their best foot forward" in efforts to realize the objectives of the NRA program by doing their utmost to create jobs and stimulate business is found in the rapidly increasing number of orders for Spring Clean Up and Paint Up display material which are being received by the National Clean Up and Paint Up Campaign Bureau in Washington. Some orders are being received by telegram, indicating intensive efforts to influence the public, through window displays, to Clean Up and Paint Up their properties while prices remain at an advantageous level.

Interesting Lacquer Material

Pentaerythritol is arousing interest abroad as a new lacquer material, according to a recent report appearing in *Chemical Age* (London) Dec. 9, p. 530.

Prepared as far back as 1900 by condensation of formaldehyde with acetaldehyde in presence of lime, pentaerythritol $C(CH_2OH)_4$, has aroused renewed attention of recent years on account of its possible application in the lacquer industry and the explosive qualities of its nitration products. As condensing agent in the reaction in place of lime, H. Molinari *Giornale di Chim. ind. ed applicata*, 1933, page 325) states that caustic can be used and is to be preferred in continuous working where reaction product is concentrated without delay.

For producing pentaerythritol by the lime process, the theoretical mixture of formaldehyde and acetaldehyde is 1st held at a temperature of 15° C. in the presence of water and pure calcium oxide (free from carbonate). Temperature is allowed to rise to 40° C. in the course of 2 hours, when the solution of the reaction product is filtered, concentrated to about one-quarter of the original volume and centrifuged. Partial purification is then achieved by redissolution in water acidified with sulfuric and concentration to the crystallization point. Crystal mass is centrifuged and dried in a vacuum and although still far from pure (containing dipentaerythritol, ash and resins), can be used for nitration. Further purification by crystallization is recommended, however, with a view to obtaining a more satisfactory yield of nitration product. After the 1st crystallization the melting point is 220° to 225° C. which is raised by repeated crystallization to 238°C., but only at the cost of a loss of as much as 30% in the yield (according to Richter the pure substance melts at 250° to 255° C.). It should be noted that the dipentaerythritol met with in the crude

Domestic Flaxseed Receipts by Weeks

Week Ending	Feb. 3		Feb. 10		Feb. 17		Feb. 24		March 3	
	1934	1933	1934	1933	1933	1934	1933	1934	1934	1933
Minneapolis cars	33	34	23	20	21	10	13	17	6	16
Duluth cars	12	10	16	9	13	3	10	5	16	13
Winnipeg cars	3	8	1	4	5	3	1	0	2	8
Totals to date this crop*	3,187	6,849	3,227	6,882	3,266	6,898	3,290	6,920	3,314	6,957

*Aug. 1.

Minneapolis Linseed Oil and Meal Shipments

Week Ending	Oil in Pounds		Meal in Pounds	
	1934	1933	1934	1933
Feb. 2	307,294	1,292,390	2,828,161	1,660,361
Feb. 9	946,157	831,552	2,288,065	1,562,105
Feb. 16	746,784	782,092	2,354,150	1,371,658
Feb. 23	705,419	692,422	2,226,294	1,691,417
March 2	596,616	1,282,061	2,373,460	1,844,965
Totals to date	14,636,547	25,675,375	52,679,047	58,245,673

Flaxseed Prices in Primary Centers

Week Ending	Minneapolis			Duluth			Winnipeg			Buenos Aires	
	Cash	May	July	Cash	May	July	Cash	May	July	1934	1933
Close Jan. 31	....	$1.88	1.90	....	1.89½	1.90	....	1.55⅝	1.54½	.97½	.59⅞
Feb. 2	1.92	1.86	1.88	1.90	1.89	1.89½	1.51½	1.53½	1.52½	.97⅝	.59⅝
Feb. 9	1.89¾	1.84¾	1.87	1.88¾	1.87¾	1.88	1.49¼	1.51¼	1.49¾	1.00¾	.59½
Feb. 16	1.86½	1.83½	1.84¾	1.88	1.87	1.87¾	1.49¾	1.51¾	1.52⅝	1.01⅞	.58¾
Feb. 23	1.87½	1.83½	1.85	1.86	1.86	1.87	1.51	1.53	1.52	1.02¼	.58½
Close Feb. 28	1.86	1.82	1.83½	1.84¼	1.84¼	1.85¼†	1.50	1.52*	1.50¾†	1.01½	
Net loss or gain	....	−.06	−.06½	....	−.05¼	−.04¾	....	−.03⅝	−.03¾	+.04	

†Asked; *Bid.

Linseed Oil Prices, Minneapolis, London, San Francisco & Chicago

Week Ending	Minneapolis		London Weekly High-Low *		San Francisco		Chicago		N. Y. City	
	Carlots	Tanks	High	Low	Carlots	Tanks	Carlots	Tanks	Carlots	Tanks
Close Jan. 31	9.5c	8.9c	18s	18s	9.6c	9.0c	9.3c	8.7c	9.3c	8.7c
Feb. 2	9.5	8.9	18s 4½d	18s	9.6	9.0	9.3	8.7	9.3	8.7
Feb. 9	9.5	8.9	18s 4½d	18s 3d	9.6	9.0	9.3	8.7	9.1	8.5
Feb. 16	9.3	8.7	18s 4½d	18s 3d	9.6	9.0	9.7	9.1	9.1	8.7
Feb. 23	9.5	8.9	19s	18s 9d	9.6	9.0	9.5	8.9	9.3	8.7
Feb. 28 Close	9.5	8.9		18s 4½d	9.6	9.0	9.5	8.9	9.3	8.7

*Per cent.

Buenos Aires Flaxseed Shipments, Stocks

Week Ending	Exports in Bushels*					Total	Same Week '33	Since January 1*					Total		Visible Supply	
	U. S.	U. K.	Cont.	Orders	Others	1934		U. S.	U. K.	Cont.	Orders	Others	1934	1933	1934	1933
Feb. 9	776	59	850	618	24	2,327	2,157	2,020	59	3,721	5,646	64	11,510	10,933	5,118	5,512
Feb. 16	39	47	323	1,016	..	1,425	2,220	2,059	106	4,044	6,662	64	12,935	13,153	5,512	5,118
Feb. 23	59	20	358	945	..	1,382	1,961	2,118	126	4,402	7,607	64	14,317	15,114	5,905	5,512
March 2	457	39	185	1,177	24	1,882	668	2,575	165	4,587	8,784	88	16,179	15,782	6,299	5,906

*000 omitted.

Indian Flaxseed Shipments

Week Ending	Exports in Bushels*				Same Week Last Year*				Same Apr. 1, 1933*			Same Apr. 1, 1933*			Total*	Total*
	U. K.	Cont.	Others	Total	U. K.	Cont.	Others	Total	U. K.	Cont.	Others	U. K.	Cont.	Others	1934	1933
Feb. 9	88	36	36	160	..	24	..	24	8,780	3,104	1,892	564	1,836	316	13,776	2,716
Feb. 16	...	28	..	28	40	76	..	116	8,780	3,132	1,892	604	1,912	316	13,804	2,832
Feb. 23	48	8	..	56	4	8	..	12	8,828	3,140	1,892	608	1,920	316	13,860	2,844
March 2	156	28	..	184	68	32	24	124	8,984	3,168	1,892	676	1,952	340	14,044	2,968

*000 omitted.

product yields a hexa-nitrate on nitration which does not detract from the technical value of pentaerythritol nitrate as an explosive.

Details of what is claimed to be improved nitration method are set forth by Dr. A. Stettbacher, of Zurich, in the October issue of *Nitrocellulose* (Berlin). A remarkable feature of the process is that it dispenses with sulfuric in the nitration liquid thus contrasting with the requirements during nitration of glycerine and cellulose, etc., where a large proportion of sulfuric is indispensable. Other notable features of the process are the relatively small proportion of nitric acid required, high yield of nitration product, the possibility of conducting the reaction without artificial cooling at temperatures between 15° to 25° C., and the comparative absence of danger during the reaction. In spite of the high explosive efficiency of the tetranitrate process in question is described as one of the simplest reactions of explosives technology.

Novel Capping Device

Ferdinand Gutmann & Co., manufacturer of capping and sealing devices, Brooklyn, N. Y., has new service for can manufacturers for supplying can nozzles complete with C. T. screw caps to provide a combination nozzle and cap, leading to a much improved sealing condition with greater ease in removal of caps from cans and maintaining the necessary seal and reseal advantages. Gutmann new type J, or "Filma-Seal," for use on cans makes a seal that prevents leakage and evaporation; also guards against counterfeiting. Company makes standard sizes for varnish, polish and cleaning fluid.

Green Bay Glass has been appointed northeastern Wisconsin distributors for Berry Brothers' line of paints, varnishes, lacquers and enamels, and has changed its name to Green Bay Glass and Paint Co.

First U. S. tung oil processing plant will be erected at Ocala, Fla.

Naval Stores

Prices Move Higher

The past month witnessed sharp price rises. A number of reasons have been assigned for such action including the fact that after much internal dissension between various groups within the naval stores industry, and faced with the realization that the AAA apparently planned to make operative despite objections the proposed marketing code, all factors (using the term in its broad sense) agreed to sign in the interest of industry harmony. The code became effective on Feb. 21.

Despite the much better prices prevailing, the movement from the field to the coast primary marketing centers has not been unusual and stocks at these points are not excessive. In fact shipments were particularly heavy out of Savannah. The new season will find the statistical picture greatly improved from what it was a year ago. Several rises were noted in FF wood rosin and on Feb. 21 the price reached $5.30.

On March 1 F F wood rosin was quoted at $5.10 per 280 lbs. gross or 235 lbs. net, f.o.b. Southern shipping points in carload lots.

Control committee, empowered to establish production quotas for gum rosin and gum turpentine under the marketing agreement concluded recently between the Dept. of Agriculture and the producers of naval stores, has been selected by the votes of producers as follows:

To represent North Carolina and South Carolina—W. L. Rhodes, Estill, S. C.

Following shows total production of producers (except one small producer) of steam and solvent products during January, and total stocks at plants at close of business on Jan. 31.

	Rosin 500-lb. barrels	Turpentine bbls. (50 gallons)	Pine oil Gallons
PRODUCTION			
Month of Jan.	**46,850**	**7,970**	**305 445**
Total from April 1, 1933	**397,119**	**63,589**	**2,530,429**
STOCKS AT PLANTS			
Total January 31, 1934	**83,007**	**18,020**	
March 31, 1933	**98,615**	**12,387**	

Note—Rosin production and stocks include all grades of wood rosin.

Georgia—W. B. Gillican, Homerville; G. W. Varn, Valdosta; W. O. Wingate, Ocilla.

Florida—R. L. Black, Gainesville; A. F. Bullard, DeFuniak Springs; E. A. McCloskey, Lake City.

Alabama—M. C. Stallworth, Mobile.

Southwestern Territory—R. M. Newton, Wiggins, Miss.

January Exports

Exports of naval stores from the U. S. for January showed a total of 20,404 barrels turpentine, composed of 18,687 gum and 1,717 wood, as against 15,810 barrels for January, '33, of which 14,420 were gum, and 1,389 wood.

In rosins the January shipments were 77,467, made up of 58,816 gum and 18,651 wood, as against 78,880 for January, '33, composed of 66,076 gum and 12,804 wood.

Following table shows the foreign movement of naval stores, gum and wood combined for the month of January and for the 10 months of April-January:

January

	Turpentine	*Rosin*
1934	20,404	77,467
1933	15,810	78,880
1932	15,264	116,878
1931	22,548	74,038
1930	17,132	97,153

April-January

	Turpentine	*Rosin*
1934	269,691	1,034,520
1933	205,376	912,186
1932	229,362	972,290
1931	302,871	1,088,106
1930	316,788	,1,210,058

For 10 months there was an increase in the foreign movement of spirits turpentine over last year of 64,315 barrels, or 32%, and in rosin of 122,334 barrels, or 13%.

Mex. Naval Stores For '34

Mexican naval stores '34 plans call for 2 plants to operate on '33 schedule and a third plant, which was idle during '33, to resume productions; so, the total number of crops worked in 1934 will be in excess of last year's. December shipments were 16,000 gals. of turpentine sent to the U. S. and about 100 metric tons, net, of rosin shipped to Mexican consumers.

Rosin-Turpentine Export Figures (April-December)

	Season-Rosin†				*Season-Turpentine*			
Country	*1933*	*1932*	*1931*	*1930*	*1933*	*1932*	*1931*	*1930*
U. K.	203,740	169,973	195,994	238,444	108,988	84,459	88,843	142,748
Germany	185,623	197,587	176,589	197,232	40,195	22,780	28,419	29,730
Italy	35,402	27,109	26,078	30,178	1,211	1,022	1,508	.....
Netherlands	76,679	75,502	56,037	65,377	44,150	36,020	35,597	37,209
Belgium	24,026	20,168	14,542	20,723	12,160	8,786	15,616	23,769
Norway	9,474	8,973	4,747	9,873	.....	.....	.....	.....
Sweden	26,996	22,291	18,294	26,932	.....	.....	.....	.....
S. America	136,297	132,771	147,530	191,909	6,677	6,106	9,831	11,202
Japan	66,644	54,891	77,466	71,172	1,008	635	1,351	1,043
Dutch E. I.	64,023	37,177	38,287	46,724	.....	.....	.....	.....
Aust. & N. Z.	18,936	9,155	11,520	12,271	10,498	8,790	9,523	8,587
Canada	41,689	33,859	37,561	42,674	16,369	14,577	17,577	17,700
Cuba	12,061	11,883	14,466	14,233	368	347	385	638
Europe	578,134	527,251	503,381	602,574	210,484	155,708	172,713	234,626
Total Outside of Europe	378,929	306,055	352,035	411,584	38,804	33,857	41,385	45,697
Total	957,063	833,306	855,412	1,014,068	249,287	189,566	214,098	280,323

†In bbls. of 500 lbs. gum and wood rosin. Exports for the past month may be found by subtracting figures given on page 163 of CHEMICAL INDUSTRIES, (February number) from the figures above.

London Naval Stores Market

Week Ending	*Rosin Weekly High—Low W. W. Grade*	*Turpentine Weekly High—Low*	*American Turpentine Stocks 1934*	*1933*
Feb. 2	15s 6d	47s 9d—46s 9d	15,131	18,502
Feb. 9	16s	51s 9d—49s 3d	15,392	16,740
Feb. 16	16s	51s 9d	14,468	17,458
Feb. 23	17s—16s 9d	53s 6d	18,277	15,624
Close Feb. 28	17s 6d	51s 3d	15,977(Mar. 2)	14,531

Sampling Rosin

A. S. T. M. Committee D-17 Naval Stores, included in its recent report proposed methods of sampling and testing rosin which were published primarily for criticisms and suggestions. Methods have been tried and found to give reliable results in hands of experienced analysts. This group has also developed proposed methods of test for the viscosity of rosin by the ring-and-ball method. Committee requested no action on these two test methods, but is desirous of obtaining the reaction of those interested. A. S. T. M. Headquarters, 1315 Spruce St., Philadelphia, Pa.

Traffic

Shippers' Conference of Greater New York declared its opposition recently to proposed transfer of supervision of intercoastal shipping from the Shipping Board to the I. C. C. Action was taken at a monthly meeting at the office of the Merchants' Association. Proposal is included in a bill sponsored recently by Senator McCarran of Nevada.

Members of the conference unanimously supported the report of Dabney T. Waring, chairman of its rate committee, recommending that the bill be opposed. Mr. Waring said that the Shipping Board now provided adequate regulation of the intercoastal ship lines, and warned that transfer of control to the I. C. C. would mean that water transportation would be subjected to rail rates as a yardstick of measurement.

"Rail and water rates," said Mr. Waring, "never should be fixed by a single standard, and if ever a single Federal body, particularly the I. C. C., were given control of both groups, water transportation would inevitably be subjected to the terms now governing rail freight."

Statistics of the Jacksonville Market

Grade	*Jan. 31*	*Close Feb. 3*	*Feb. 10*	*Feb. 17*	*Feb. 24*	*Close Feb. 28*	*Mar. 3 1933*	*Net Gain or Loss for Month*	*Net Gain or Loss for Year*
B....	$3.50	$3.60	$3.75	$4.00	$4.50	$4.25	$1.50	$+0.75	$+2.75
D....	3.60	3.70	4.10	4.50	4.60	4.50	1.70	+0.90	+2.80
E....	4.05	4.25	4.60	5.10	5.25	5.00	2.30	+0.95	+2.70
F....	4.15	4.55	4.85	5.25	5.25	5.15	2.62½	+1.00	+2.52½
G....	4.20	4.55	4.85	5.25	5.25	5.15	2.65	+0.95	+2.50
H....	4.35	4.55	4.85	5.25	5.25	5.20	2.75	+0.85	+2.45
I....	4.40	4.55	4.85	5.25	5.25	5.25	2.77½	+0.85	+2.47½
K....	4.45	4.55	4.85	5.25	5.25	5.25	3.05	+0.80	+2.25
M....	4.50	4.55	4.90	5.25	5.40	5.25	3.25	+0.75	+2.00
N....	4.50	4.55	4.95	5.25	5.45	5.25	3 75	+0.75	+1.50
W.G..	4.55	4.60	5.00	5.25	5.45	5.30	3.85	+0.75	+1.45
W.W.	4.90	5.00	5.15	5.40	5.50	5.30	3.95	+0.40	+1.35
X....	4.90	5.00	5.15	5.40	5.50	5.30	3.95	+0.40	+1.35
Market	Firm	Firm	Firm	Firm	Firm	Firm	Steady		
Price.	49c	50¼-50¾c	54½c	57½c	59c	58½c	40c	$+0.09½	$+0.18½
Market	Firm	Firm	Firm	Firm	Firm	Firm	Quiet		

					Same as Last Year			
	Spirits		*Rosin*		*Spirits*		*Rosin*	
Week Ending	*Receipts*	*Shipments*	*Receipts*	*Shipments*	*Receipts*	*Shipments*	*Receipts*	*Shipment.*
Feb. 1-3	170	312	1,984	438	202	....	1,481	....
Feb. 10	271	2,221	3,448	8,926	371	1,582	4,170	8,115
Feb. 17	359	918	4,026	5,202	320	1,203	4,845	15,964
Feb. 24	378	3,976	4,822	6,285	251	1,128	5,299	3,862
Feb. 26-28	194	231	2,006	1,604	303	....	3,501	....
Total for month	1,372	7,658	16,286	22,455	1,447	....	19,296	....
Since Apr. 1 (Mar. 3)	101,515	114,770	409,724	464,261	91,945	95,787	363,604	399,750
Foreign	.....	95,951	.....	311,988	....	74,141	....	290,419
Domestic	.....	18,819	.....	152,273	....	21,646	....	109,331

Stocks	*Spirits*	*Rosin*	*Same as Last Year* *Spirits*	*Rosin*
April 1	36,712	116,429	41,691	155,883
Feb. 1	29,535	68,508	41,323	135,166
Feb. 28	23,334	59,058	.....	.....
Loss or gain in stocks in past month	—6,201	—9,450	.....	.....
Loss or gain in stocks since April 1	—13,378	—57,371	.....	.....

Statistics of the Savannah Market

Grade	*Close Jan. 31*	*Feb. 3*	*Feb. 10*	*Feb. 17*	*Feb. 24*	*Close Feb. 28*	*Feb. 24, 1933*	*Net Gain or Loss for Month*	*Net Gain or Loss for Year*
B....	$3.50	$3.60	$3.80	$4.10-40	$4.50	$4.25	$1.50	$+0.75	$+2.75
D....	3.60	3.70	4.05	4.30-50	4.60	4.50	1.75	+0.90	+2.75
E....	4.05	4.25	4.70	5.10	5.25	5.00	2.30	+0.95	+2.70
F....	4.15	4.55	4.92½	5.20-25	5.40	5.15	2.60	+1.00	+2.55
G....	4.20	4.55	4.92½	5 20-25	5.40	5.15	2.65	+0.95	+2.50
H....	4.35	4.55	4.92½	5.20-25	5.40	5.20	2.87½	+0.85	+2 32½
I....	4.40	4.55	4.92½	5.20-25	5.45	5.25	2 87½	+0.85	+2.37½
K....	4.45	4.55	4.95	5.20-25	5.45	5.25	3.05	+0.80	+2.20
M....	4.50	4.55	4.95	5.25	5.45	5.25	3.30	+0.75	+1.95
N....	4.50	4.55	4.95	5.25	5.45	5.25	3.75	+0.75	+1.50
W.G..	4.55	4.60	4.95	5.25	5.45	5.30	3.85	+0.75	+1.45
W.W.	4.90	5.00	5.30	5.50	5.55	5.30	3.95	+0.40	+1.35
X....	4.90	5.00	5.30	5.50	5.55	5.30	3.95	+0.40	+1.35
Market	Firm	Firm	Firm	Firm	Firm	Firm	Steady		
				SPIRITS OF TURPENTINE					
Price.	49½c	52¼c	55¾c	58¼c	61c	58½c		+$0.09	
Market	Firm	Firm	Firm	Firm	Firm	Firm			

Highest turpentine price posted on Savannah Board of Trade, April 1, 1920 at $2.33 a gal., Sept. 4 1896 at 22c a gal. Lowest 1933 Savannah price, 37c a gal., highest 50c a gal.

					Same as Last Year			
	Spirits		*Rosin*		*Spirits*		*Rosin*	
Week Ending	*Receipts*	*Sales*	*Receipts*	*Sales*	*Receipts*	*Sales*	*Receipts*	*Sales*
Feb. 1-3	113	44	871	422	149		1,091	
Feb. 10	218	103	3,411	1,303	278		2,385	
Feb. 17	261	117	2,876	1,531	136		2,374	
Feb. 24	266	71	3,564	1,159	247		2,119	
Feb. 26-28	153	41	3,587	1,052	179		1,541	
Total for February	1,011	376	14,309	5,467	989		9,510	

Stocks	*Spirits*	*Rosin*
Jan. 31	11,263	90,157
Feb. 28	7,195	84,638
Loss or gain in stocks in past month	—4,068	—5,519

Statistics of the Pensacola Market

		Turpentine			*Rosin*	
Week Ending	*Receipts*	*Shipments*	*Stocks*	*Receipts*	*Shipments*	*Stocks*
Jan. 27	172	614	29,095	505	3,377	14,608
Feb. 3	141	2,231	27,008	527	2,644	12,491
Feb. 10	40	944	26,104	250	1,229	11,645
Feb. 17	115	1,249	24,970	758	1,076	11,327
Feb. 24	37	790	24,217	324	1,496	10,155

Phosphate Rates

I. C. C. has granted petition of the traffic department of the Chamber of Commerce and the State Docks Commission for suspension of proposed cancellation of proportional rates on Florida phosphate rock from the port of Mobile and other gulf ports to Memphis, East St. Louis, and St. Louis. A date for hearing on the question has not been set. Present rate on rock in carload lots from Mobile to Memphis is $2.43 per long ton, and to St. Louis and East St. Louis it is $3.77. Cancellation of the proportional rate would put the old rate of $3.60 per ton of 2,000 lbs. to Memphis and $5.90 to St. Louis.

Clark, Carbide Traffic Manager

A. B. Clark has been appointed Carbide's general traffic manager, succeeding the late Herbert Thompson. Mr. Clark has been connected with Carbide for 17 years in traffic work.

Cincinnati Rate Conference

A. J. Whitman was N. F. A.'s traffic representative at the recent Cincinnati conference (SFA Docket 2274) held by several freight associations. An agreement was obtained from carriers *not to cancel* the interterritorial rates on anhydrous ammonia, phosphate rock, superphosphate, processed tankage and sewage tankage. Mr. Whitman asked continuance of rates on bones, bone meal and spent bone black from the Gulf Ports to C. F. A. territory as covered by items Nos. 9345-9360 and 9390 of Emerson's tariff 5-H, ICC 185. Committee raised question of whether or not shipments could not be confined to actual points of shipments and actual points of destination because it was of the opinion that all of the points involved in these items were not necessary. The Committee also raised question as to whether or not there was any packing house tankage moving from the various central freight Association points to southern points.

N. Y. P. S. C. Rate Changes

N. Y. P. S. C. has approved commodity freight rates of the N. Y. Central (East) on molasses, blackstrap, including final molasses and refiners' residual syrup, in tankcars, carload, minimum weight 90% of gallonage capacity of shell of tank, unless such weight exceeds carrying capacity of car, in which event minimum weight will be 90 per cent of carrying capacity of car from Albany to Binghamton (on Del. L. & W.), 15c, a reduction of 1c per hundredweight, effective Jan. 22.

Cancellation of commodity rates by the N. Y. Central (East) on copper sulfate, carloads, from Long Island stations, as follows, has been approved by the Commission:—Long Island City, Winfield to Whitestone Landing inclusive, Forest Hills to Hollis inclusive, Blissville, Nichols Siding, Laurel Hill to Richmond Hill inclusive, Evergreen to Bay Ridge inclusive, and Woodhaven Junction to Ozone Park, inclusive, to stations on the N. Y. Central: Rome, 22.5c per hundredweight; Depew, East Buffalo to Lewiston inclusive, Medina to Lockport, 25c per hundredweight; also from Long Island City, Blissville and Nichols Siding to Sodus, 25c per hundredweight. Class rates will apply. Increases are effective Feb. 24, '34.

Gums, Waxes, Shellac

Gum Prices Irregular

Movement in the varnish gums was mixed in the past 30 days, some moving into higher levels while others were revised downward. Price changes were the first of any consequence since last November and were said to represent mainly the necessary adjustments for the change in the status of the dollar. In some cases better demand coupled with shortage of spot stocks was responsible.

Importations of gums and waxes in 1933, compare with figures for 1932 and 1933 as follows:

	Pounds		
	1931	*1932*	*1933*
Arabic	7,264,107	5,508,627	5,597,664
Tragacanth	1,673,289	1,425,143	2,364,188
Karaya and talka	4,581,716	3,544,077	4,121,559
Other gums and resins	7,336,018	4,547,788	4,810,856
Totals	20,855,130	15,025,635	16,894,267

Novel Shellac Situation

Shellac was much quieter in the past 3 weeks although no price revisions were announced. Replacement costs, it was reported, justified the maintenance of present levels. However the highly speculative situation in London was thought to have about ended, at least for the time being. An abortive effort to institute trading in shellac futures on the Commodity Exchange is said to have come to naught. One reason assigned is that with only 25,000,000 lbs. a year consumed the possibility of cornering was too strong. Actual shellac houses here were against such trading operations. It is said that the speculative London interests were in back of the movement and in one quarter it was reported that through the establishment of such trading they had hoped to unload in this country at favorable prices large stocks accumulated recently when the London market was cornered. It is also reported that the London speculators in shellac were the same group that were identified in the recent tin pool. The name "Commodity Crusaders" is mentioned.

Important Gum Price Changes

	Feb. 28	Jan. 31
ADVANCED		
Aloes, Barbadoes	$0.87	$0.85
Batavia, dust	.06½	.06¼
E seeds	.09	.08
Ester	.06¼	.06
Manila G	.11½	.11
M. A. sorts	.06¾	.06½
D. B. B. chips	.09	.08½
Pontianak	.18¼	.17½
DECLINED		
Arabic, amber sorts	$0.08¼	$0.08½
Batavia, Singapore No. 1	.16¾	.17¼
Copal Congo, dark amber	.09	.09¾
Water white	.46	.47
Manila, A	.12½	.13¾
B	.11¾	.12¾
Elemi No. 1	.10½	.11
No. 2	.10¼	.10¾

Important Wax Price Changes

	Feb. 28	Jan. 31
ADVANCED		
Candelilla	$0.12	$ 0.11½
Carnauba, Flor	.36	.32
No. 1 Yellow	.34	.30
No. 2 N. C.	.22	.20
No. 3 N. C.	.19½	.16¼
No. 3 Chalky	.19	.16
Japan	.06½	.06
Montan	.10½	.10

Waxes are Higher

Sharp advances featured the wax markets. Carnauba, all grades, went into new high ground as stocks here and in Brazil seemed to be entire inadequate for the current demand. Brazilian exporters are said to be holding for still higher prices and shipments were small. An extreme shortage in No. 2 yellow was laid to the defaulting of a Brazilian shipper on all obligations.

Webster Organizes

James A. Webster, has organized Webster Wax and Oil with offices in the Starrett-Lehigh Bldg., 601 W. 26 st., N. Y. City. Company is engaged in bleaching beeswax, and is also prepared to supply other waxes, mineral oils and petrolatum.

New Partners

Thurston & Braidich's senior partner, Edward Young, announces partnerships for Edward Buckley, Charles Aldon, and Charles R. Rosvear, Jr.

Casein in '33

Casein was brought into the U. S. in larger quantities during '33 than in the preceding year, according to C. C. Concannon, Chief, Chemical Division, Bureau of Foreign and Domestic Commerce. General imports of casein in '33 were 6-fold those of '32 on a quantity basis and were invoiced at 12 times that year's value. According to preliminary data, arrivals in '33 totaled 8,141,598 lbs., valued at $444,689, in comparison with 1,201,014 lbs., valued at $38,466, in '32. On the other hand, U. S. production was light compared with previous years.

Foreign Sources of Supply

Principal supplier of foreign casein is Argentina, smaller amounts being received from France, Germany, Belgium, United Kingdom, Canada, British India and New Zealand. Shipments from Argentina in '33 aggregated 6,926,810 lbs. valued at $348,456 compared with arrivals in '32 of 802,892 lbs. valued at $13,703. Incoming shipments from France in '33 increased to 446,450 lbs. valued at $36,101 from 76,717 lbs. with a value of $4,761 in '32 while shipments from Germany totaled 635,082 lbs. valued at $51,192 against 276,317 lbs. with a value of $17,553 in the preceding year. Although imports from Argentina registered a high level in '33, Mr. Concannon said that this achievement was accomplished during the last half of the year when over 6,000,000 lbs. were imported from July to October, inclusive. Average invoice unit value of shipments

Shellac Prices, Weekly High-Low

	London		*U. S. in c.*		*Calcutta*	*N. Y. City*					*Shellac Varnish, N. Y. City*					
						Bone Dry					*Orange*			*White*		
Week Ending	*March High-Low*	*May High-Low†*	*Close of week March*	*May*	*T.N.C.&F. N. Y.*	*10 bbls.*	*5-9 bbls.*	*1-4 bbls.*	*T. N.*	*Superfine*	*Garnet*	*5 lb. cut*	*4½ lb. cut*	*4 lb. cut*	*5 lb. cut*	*4½ lb. cut*	*4 lb. cut*
Close Jan. 31	94s	95ts			17¼c	29c	30c	31c	21–21¾c	23–23¾c	24–25c	$1.20	$1.15	$1.10	$1.45	$1.40	$1.35
Feb. 2	95s-91s	96s-89s	19.7	19.5	16⅝	29	30	31	21–21¾	23–23¾	24–25	1.20	1.15	1.10	1.45	1.40	1.35
Feb. 9	91s 6d-90s	91s 6d-89s 6d	19.8	19.8	17⅛	29	30	31	21–21¾	23–23¾	24–25	1.20	1.15	1.10	1.45	1.40	1.35
Feb. 16	91s 6d-89s	91s 6d-88s	19.4	19.7	16¾	29	30	31	21–21¾	23–23¾	24–25	1.20	1.15	1.10	1.45	1.40	1.33
Feb. 23	93s-89s 6d	94s-91s	19.8	20.1	17¼	29	30	31	21–21¾	23–23¾	24–25	1.20	1.15	1.10	1.45	1.40	1.35
Close Feb. 28	89s 6d	91s 6d			17⅛	29	30	31	21–21¾	23–23¾	24–25	1.20	1.15	1.10	1.45	1.40	1.55

† per cwt.

received from Argentina in '33 was approximately 5c a lb. compared with less than 2c in '32. U. S. production of casein has declined in recent years. Output in '32, latest year for which data are available, amounted to 24,428,000 lbs. with an approximate value of $1,600,000. According to the Bureau of the Census production value in '31 totaled $2,236,845 and in '29 aggregated $5,725,571. California led in domestic production in '32 followed in order of output by Wisconsin, New York, Illinois, Vermont, Idaho, Minnesota, Pennsylvania, Michigan, Oregon, Washington, Ohio, New Jersey, Utah and Massachusetts.

Metals and Alloys

New Tin Uses

Having more or less succeeded in equalizing supply and demand, tin-producing industry must now make efforts to increase demand. The position cannot be regarded as satisfactory so long as production and exports are severely restricted, *The Chemical Age* (London) points out, for under these conditions working costs are high, and there is always the possibility that one or more of the producing countries may decide to withdraw from the scheme. Only when the consumption of the metal reaches a scale which will allow mines to work at full capacity without endangering the price level, will it be possible to announce that the industry has been restored to a healthy condition. Apparently this is recognized by the International Tin Committee, which has now taken steps to set up a Tin Research and Development Council for the purpose of stimulating consumption. This council will endeavor to open up new outlets for the metal and consolidate existing markets, and in this work it will be assisted by the Governments of the principal tin-producing countries of the world—Malaya, Bolivia, Dutch East Indies, Nigeria and Siam. A special Research and Development Committee had also been set up in this country, to work in close co-operation with the International Council. It is claimed that the sales program which has been formulated will stand comparison with the marketing arrangements of the largest and most progressive business organizations in the world. Research will be directed to all the most pressing problems which concern the industrial applications of tin.

Export Quotas

International Tin Committee on March 5 adjourned until May without deciding on an increase in export quotas, as had been expected in recent weeks. Quotas were discussed, but action unexpectedly deferred until the May meeting in Paris. A proposed "buffer pool" to eliminate fluctuations in the tin market was to have been discussed, but also was tabled until May.

Supporters of the pool idea said that in the event of a sudden, large increase in demand there would be sufficient stocks in a pool to meet it, without waiting for the slower authorization by the committee for increased production.

Opponents of the pool scheme feared that it would only prolong the present tin production restrictive agreement.

That Copper Code

Union Miniere du Haut Katanga is understood to be willing to enter proposed copper cartel if consideration is given to company's low production costs. It is pointed out that although these costs are the lowest in the world, nevertheless, they increase as the rate of production decreases.

Mexican Zinc has been granted concession by the Mexican government to erect a zinc refinery and sulfuric plant at Saltillo (cost estimated at 2,500,000 pesos).

Possible Alabama tin production reported by Charles A. Dean, Coosa Turpentine, Alexander City, Ala.

Production, Shipments, Stocks of the Metals

	January 1934†	*January 1933†*	*December 1933†*	*December 1932†*	*November 1933†*	*November 1932†*
Copper Production, U. S.§	18,000	.....	15,500	.....	29,000	.....
Foreign	58,000	60,000	60,000	.....	67,000	.....
World total	91,000	.....	97,000	.....	97,000	.....
Copper deliveries, U. S.	31,000	.....	25,000	.....	22,000	.....
Foreign	66,500	.....	68,500	.....	69,000	.....
World total	97,500	.....	93,500	.....	.....	.....
Copper, world stocks	.....	.....	640,000	.....	639,500	.....
Lead production, U. S.	34,818	.....	36,649	.....	38,459	.....
World total	122,724	105,262	134,328	.....	132,830	.....
Lead stocks as month closed	207,674	.....	203,061	.....	284,625	.....
Lead, domestic shipments	33,911	.....	26,034	.....	30,681	23,065
Zinc production, U. S.	32,954	18,867	32,004	18,653	32,900	16,078
World total	105,782	79,222	103,813	.....	102,349	.....
U. S. shipments, slab zinc	26,532	15,162	27,667	15,745	27,033	15,970
U. S. zinc, unfilled orders	26,717	6,313	15,978	8,478	20,633	8,640
Zinc stocks, U. S.	111,982	128,561	105,560	124,856	101,004	121,948
Zinc stocks, cartel	154,203	.....	147,975	.....	141,919	.....
U. S. retorts oper. end of period	28,744	22,660	27,190	21,023	28,142	19,753
Silver production, U. S.*	2,025	1,960	1,562	1,627	1,863	.....
World total*	14,444	.....	12,949	.....	14,158	.....
Tin shipments from cartel countries	.....	.....	5,008	.....	5,376	.....
World tin visible supply°	22,476	.....	.....	.....	26,075	47,477

*In oz.; 000 omitted; ‡long tons; †in tons; °February American tin deliveries—2,940 tons; §'33 world copper production 902,000 long tons, against 870,000 tons in '32, a gain of 4%. World copper consumption gained 16½%—1,125,000 tons against 965,000 tons.

Chemical Specialties

With the number of exhibitors and entries running well ahead of the same period last year, indications are that all records will be broken by the Fourth Packaging Exposition and the Third Irwin D. Wolf Award, to be held at the Hotel Astor from March 13 to 16, inclusive, under the sponsorship of the American Management Association.

Lye Industry Code

Announcement was made on Feb. 20 that Administrator Hugh S. Johnson had approved proposed code of fair competition for the lye industry. His approval was given with the provision that the

Weekly Price Statistics of the Metals

	Lead, Weekly		*High-Low*	*Zinc, Weekly High-Low*			*Copper Weekly High-Low*	*Tin, Weekly High-Low*		*Silver Bullion, Weekly High-Low*	
	E. St.		*London*	*E. St.*		*London*	*Conn.*				*(pence)*
Week Ending	*Louis*	*N. Y.*	*per ton*	*Louis*	*N. Y.*	*per ton*	*Valley*	*Straits*	*Standard*	*N. Y.*	*London*
Close Jan. 31	.0390	.140	£11 6s 3d	.0430	.0465	£14 16s 3d	8c	51c	50.60c	44c	19½
Feb. 2	.0390–.0300	.040	£11 12s 6d £11 6s 3d	.0430–.0425	.0467–.0460	£14 17s 6d £14 12s 6d	8⅛	51.45–50.35	51.00–50.00	44 –43⅜	19⅝–19¼
Feb. 9	.0390	.040	£11 15s £11 13s	.0440–.0430	.0475–.0465	£ 15 1s 3d £14 18s 3d	8–8¼	51.35–50.80	51.90–50.45	44¾–44	19⅝–19⅜
Feb. 16	.0390	.040	£11 11s 3d £11 8s 9d	.0440	.0477–.0475	£15 £14 16s 3d	8	52.10–51.45	51.75–51.05	46 –44½	20⅛–19⅝
Feb. 23	.0390	.040	£11 15s– £11 12s	.0440	.0477–.0475	£14 18s 9d £14 12s 6d	8⅛	52.60–51.85	52.20–51.50	46⅝–46¼	20⅝–20¼
Close Feb. 28	.0390	.040	£11 15s	.0440	.0475	£14 15s	8	52	51.25	46⅜	20⅛
1934 High-Low	.0390–.030	.040–.040		.0445–.0425	.0475–.0460		8½–8	53.25–50.37	51.80–49.85		

Zinc dust prices—there is a differential of $0.02 per lb., for carlots above St. Louis zinc market; 5 tons to carloads, $0.0275; less than 5 tons $0.325. Closing prices of other metals; antimony .0715; '34 high-low, .07¼-.0715; mercury close $75.00; high-low, $75.00-$68.00.

provisions relating to the filing of price lists or revised terms and conditions of sale be stayed, pending a further order either within a period of 60 days from the effective date of the code, or until after the completion of a study of open price associations now being made.

This code fixes a work-week of 40 hours averaged over a 2 months' period for accounting, clerical, office, store, shipping and inside employees. Employees engaged in transportation will not be permitted to work in excess of 44 hours a week, averaged over a two months' period, or in excess of 48 hours in any calendar week, and no engineer, fireman, water tender, oiler or cleaner will be permitted to work more than 48 hours in any calendar week. The hours of a watchman will be limited to 56 a week.

No other employee, with certain exceptions, will be permitted to work more than 40 hours a week, averaged over a 6 months' period, nor more than 45 hours in any week. Technical or professional employees engaged in managerial, executive or supervisory capacities, receiving $35 or more a week, are exempt from the provisions limiting the hours of work. Minimum wage rates of $14 a week or 35c an hour are established except for learners and apprentices who will be paid not less than 80% of the minimum rates.

Specialty Co. Notes

Albert P. DePuy is the new advertising manager for Metropolitan Refining, Long Island City, manufacturer of boiler compounds and other specialties. West Disinfecting has just launched a new advertising campaign in Eastern newspapers. Loma, Tennessee Corp.'s packaged fertilizer is now on the air in a series of broadcasts which started Feb. 18 over an NBC network. B. T. Babbitt has started its largest advertising campaign in the 100 years of company existance. Wet-Me-Wet, new product for cleaning windows, silverware, etc., is to receive special emphasis. Sprai, N. Y. City, has appointed Adrian Bauer of Philadelphia as advertising agency.

New Specialties

Chemical Supply, Cleveland, is putting out new line of waterproofing materials. Magnus Chemical, Garwood, N. J., is introducing "Skin-Gard" a creamy hand protector against dirty jobs. Midwest Laboratories, Chicago, is now making a moth-proofing compound. Breuer Electric Mfg., Chicago, has a new electric automatic insecticide sprayer. Armite Laboratories, Los Angeles, has a new packing and pump lubricant for dry cleaners and others using solvents. P. & G.'s new "Dreft" (soapless household detergent) is having its initial "try-out" in Indianapolis. Pynol, Burlington, Iowa, has a new pine oil antiseptic and a pine oil soap. Baltimore Paint & Color is said to have a fast glass marking ink.

DuPont's 10c Cement

The Finishes Division of duPont has just placed on the market a new 10c tube of its well-known Duco Household Cement. This is the first time this product has been made available in such a popular sized container. Among other advantages is the fact that the smaller tube makes it attractive as an item which can be carried in a kit in an automobile or boat, or on the ordinary business or social trip.

Soap Field

Hearing on code proposed for manufacturers of non-advertised and private brand toilet soaps, set for Jan. 25 was indefinitely postponed by NRA. J. A. Coulter, who was general superintendent of the Colgate-Palmolive-Peet, has been elected vice-president in charge of production and a member of the company's board of directors. He succeeds N. N. Dalton, who resigned Dec. 31.

Van Declared Winner

Federal Judge George F. Morris took 50 pages to cancel all existing contracts between Pine Tree Products of Newport, N. H., and the Teele Soap Co., Cambridge, Mass. Newport's *Argus-Champion* reports Billy B. Van, formerly of Broadway musical comedy fame, but now owner of the Pine Tree Products, as receiving numerous telegrams of congratulations.

New Members

New company members in the National Association of Insecticide & Disinfectant Manufacturers', Inc., are: Clarkson Chemical & Supply, South Williamsport, Pa.; Fuld Bros., Baltimore; Union Oil of California, Los Angeles.

Lead Tolerance

Tolerance for lead that may be present as spray residue on fruit to be harvested in '34 was announced, Dec. 11, by Acting Secretary of Agriculture. Action under the Federal Food and Drugs Act will be taken against all shipments containing in excess of 0.019 grain of lead per lb. Tolerance of 0.01 grain per lb. previously set for fluorine and for arsenic will remain in force for '34.

Grasselli's "Floragard"

Grasselli has changed name of "Manganar Rose Dust" to "Floragard." Change became necessary to prevent confusion with "Manganar" an entirely different product and also because the old name indicated that the product was only applicable for rose bushes.

Filling Device

An improved weighing and automatic filling device, which, it is said, can weigh up to a thousand one-lb. packages an hour, is being marketed by Toledo Precision Devices, Inc., Toledo, Ohio.

A new development in packaging is a glass container with applied lettering in place of a label. This was announced recently by Owens-Illinois Glass.

Oils and Fats

Refined Fish Oil Code

A public hearing on the proposed code of fair competition for the Processor or Refined Fish Oil Industry, will be held March 17, beginning at 10 a. m., in Room 126 of the Willard Hotel, by R. H. Fiedler, acting deputy administrator. This code is submitted by the Processed or Refined

Price Comparison, Principal Vegetable, Animal and Fish Oils

Oil	San Francisco Jan. 29	San Francisco Feb. 26	Chicago Feb. 2	Chicago Mar. 2	Baltimore Feb. 2	N. Y. Feb. 2	N. Y. Mar. 2
Vegetable Oils:							
Coconut, crude, tanks	2¾c[1]*	2⅝c[1]*	2¾c*	2¾c*		2¾c*	2¾c*
Chinawood, tanks	7*	7.4*	7½ del.	8.2 del.		7¼ del.	8.2 del.
Corn, crude, tanks			3¾ del.	4¾ del.		3¾°	4⅞°
Peanut, crude, tanks	5‡	5‡	4¼[1]	4¾[1]		4[1]	4¾*
Perilla, tanks	7½*	8¾*	7⅝*			7¾*	8¾*
Soybean, dom., tanks	6⅝ del.	6¾ del.	5½°	5.8°		6°	6½°
Soybean, crude, Oriental	3⅝†	3⅝†					
Sesame, crude, tanks		5⅜‡					
Fish Oils:							
Menhaden, crude, tanks					no prices	no prices	
Menhaden, light pressed, tanks			5½—5¾			5⁹/₁₀	4⁷/₁₀
Salmon, tanks	15‡	15‡	15—17‡	15—17‡		15‡	15‡
Whale, tanks							
Herring, tanks	15‡	15‡	15‡	15‡		15‡	15‡
Sardine, tanks	14‡	15‡	14—16‡	15—16‡		14—16‡	15‡
Animal Oils:							
Degras, com. dom			4—4¼	4—5			
com. neut			9½—10	10—10¼			
Lard No. 1			6¾—7¼	6¾—7¼			
No. 2			6¼—6¾	6¼—6¾			
Extra			7½—7¾	7½—7¾			
Oleo No 1			5½—6	5½—6			
No. 2			4¾—5¼	4¾—5¼			
Tallow, acidless			6½—6¾	6½—6¾			

*f.o.b. tank cars, Pacific Coast Ports; †c.i.f. Pacific Coast Ports, bulk, steamers tanks; ‡f.o.b. tank cars, Pacific Mills; °f.o.b. Mid-west mills; [1]f.o.b. producing point; n-nominal.

Fish Oil Institute, claiming to represent 95% of the industry.

What the proposed code describes as "normal" work periods would be established as follows: Chauffeurs and deliverymen, 48 hours a week; watchmen, 63 hours a week; clerical and office employees 40 hours a week and 8 hours a day; and all other employees, 36 hours a week and 8 hours a day.

Provision is made for overtime payment in cases where it is necessary to work additional hours, except that office workers receiving $35 per week, or more shall not be subject to overtime payment. Limitation of hours of labor would not apply to those engaged in managerial, executive or technical work who receive $35 or more a week. Clerical, accounting and office employees would be paid a minimum of $16 a week and a watchman would receive not less than $18. Other employees would be paid not less than 45c an hour.

Cottonseed Products

	On hand August 1	*Produced Aug. 1 to Jan. 31*	*Shipped out Aug. 1 to Jan. 31*	*On hand January 31*
Crude oil, pounds—				
1933-1934	*51,269,417	895,419,575	780,770,104	*188,908,161
1932-1933	29,523,581	931,986,439	848,408,364	149,024,090
Refined oil, pounds—				
1933-1934	†676,331,574	‡677,678,444	.....	†780,992,194
1932-1933	628,420,148	713,882,290	.....	760,342,112
Cake and meal, tons—				
1933-1934	160,874	1,306,876	1,178,212	289,538
1932-1933	114,656	1,362,244	1,131,997	344,903
Hulls, tons				
1933-1934	76,686	778,823	749,954	105,555
1932-1933	162,773	853,590	840,745	175,618
Linters, running bales—				
1933-1934	70,786	528,092	438,833	160,045
1932-1933	235,521	477,212	422,552	290,181
Hull fiber, 500-lb. bales—				
1933-1934	985	32,394	29,352	4,027
1932-1933	4,138	12,213	6,082	10,269
Grabbots, motes, etc., 500-lb. bales—				
1933-1934	3,216	24,335	18,552	8,999
1932-1933	15,250	16,768	13,850	18,168

*Includes 4,274,646 and 20,138,579 lbs. held by refining and manufacturing establishments and 14,320,860 and 21,446,200 lbs. in transit to refiners and consumers August 1, 1933, and January 31, 1934, respectively.

†Includes 5,498,953 and 4,226,596 lbs. held by refiners, brokers, agents, and warehousemen at places other than refineries and manufacturing establishments, and 12,642,917 and 2,163,310 lbs. in transit to manufacturers of lard substitute, oleomargarine, soap, etc., August 1, 1933, and January 31, 1934, respectively. ‡Produced from 735,494,014 lbs. of crude oil.

Exports for Four Months Ended December 31

		1933	*1932*
Oil, crude	pounds	7,645,660	14,866,830
Oil, refined	pounds	2,426,516	3,301,167
Cake and meal	tons of 2,000 pounds	51,960	88,482
Linters	running bales	66,457	71,293

Trend of the Cottonseed Oil Markets

(N. Y. Produce Exchange)

Bleachable Prime Summer Yellow (cents per lb. tanks)

Futures	*Jan. 31**	*Feb. 2**	*Feb. 9**	*Feb. 16**	*Feb. 23**	*Feb. 28**
Feb.	4.80—4.90	4.86—4.96	5.05—5.15	5.20	5.00	
March	4.90—4.93	4.93—4.98	5.12	5.30	5.08—5.13	5.05—5.08
April	4.90—5.10	4.95—5.10	5.12—5.30	5.30—5.50	5.10—5.35	5.04—5.14
May	5.06—5.12	5.08—5.14	5.29—5.35	5.48—5.51	5.41	5.24—5.29
June	5.10—5.20	5.10—5.30	5.32—5.50	5.50—5.70	5.45—5.60	5.25—5.45
July	5.28—5.29	5.29	5.50	5.72	5.63—5.66	5.49—5.51
August	5.30—5.43	5.30—5.50	5.56—5.70	5.75—5.85	5.65—5.80	5.50—5.61
Sept.		5.46—5.51	5.69—5.70	5.90—5.92	5.83—5.86	5.70s
Oct.						5.72—5.80
Total sales contracts for work		309(22 Switches)	316 (54 Switches)	429 (84 Switches)	264 (68 Switches)	
Spot prime summer yellow	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal
Crude, Southeast	3.37½—3.50	3.75	4.00—4.25	4.25—4.50	4.25—4.50	4.25—4.50
Valley	3.37½—3.50	3.75	4.00—4.25	4.25—4.50	4.25—4.50	4.25—4.50
Texas	3.12½—3.25	3.50	3.75—4.00	4.00—4.25	4.00—4.25	4.00

*Closing price on Fridays; sSale.

Memphis Cottonseed Meal Market

Futures	*Feb. 2**	*Feb. 9**	*Feb. 16**	*Feb. 23**	*Close Feb. 28*
Feb.	$23.95—24.20	$23.75—24.00	$24.00—24.75	$23.70	
March	24.30—24.50	23.75—24.10	24.25	23.85	$24.10—24.50
April	24.85—25.00	24.25—24.60	24.50—24.70	24.10—24.40	24.45—24.75
May	25.25—25.50	24.75—25.00	25.00—25.25	24.65—24.80	24.85—25.20
June	25.70—26.00	25.25—25.50	25.50—25.80	25.00—25.25	25.35—25.60
July	26.25—26.50	25.75	26.00—26.25	25.60—25.75	25.75—26.00
Aug.	26.75—27.00	26.25—26.60	26.55	25.85—26.15	26.00—26.25
Sept.	27.10—27.35	26.75	27.25	26.25—26.75	26.10—26.50

*Friday prices.

Cottonseed Products Prices

	Atlanta						*(Hull Eng.)*		*Chicago*		
Week Ending	*Prime Crude oil*	*7% Meal**	*Hulls Loose*	*1st cut*	*Linters Clean Mill*	*2nd cut*	*Refined Weekly High—Low†*	*Egyptian crude Weekly High—Low†*	*Prime Crude oil*	*Yellow oil Del. Chgo.*	*Edible Carlots*
Close Jan. 31	3⅝c	$24	$13	4c	3¼c	3c	15s 9d—15s 3d	13s 6d—13s	3¼—3¾c	4¾c	5½—5¾c
Feb. 7	3¾	24	13	4	3¼	3	15s 9d—15s 3d	13s 6d—13s	3⅜—4⅛	4⅞	6
Feb. 14	4	25	14	4½	4	3½	15s 9d—15s	13s 6d—13s	4 —4⅛	5⅞	6¼
Feb. 21	4½	27	14	4½	4	3¾	15s 6d—15s	13s 6d—13s	4⅛	5½	5¼
Close Feb. 28	4¼	25	14	4½	4	3¾	15s 6d	13s 6d	4¼	5½	6¼

*Interior mill points; †per cwt.

Dominion Soya Industry, Ltd., (Canada) has filed articles of incorporation with a capital of 50,000 shares of no par value.

Solvents

Sharples Solvents' new Wyandotte plant is now in operation and all manufacturing operations have been moved from Belle, W. Va. Plant personnel includes Lee H. Clark, vice-president and general plant manager; Russell H. Samis, plant superintendent; Homer A. Bohale, chief chemist; Bruce A. Hainsworth, chief engineer. Plant is the only synthetic amyl alcohol plant in the country—capacity 1,000,000 gals. per year. With this product as a basis a number of new and interesting and valuable products are being developed by the Sharples research organization either alone or in cooperation with other laboratories.

Monsanto Petroleum Chemicals

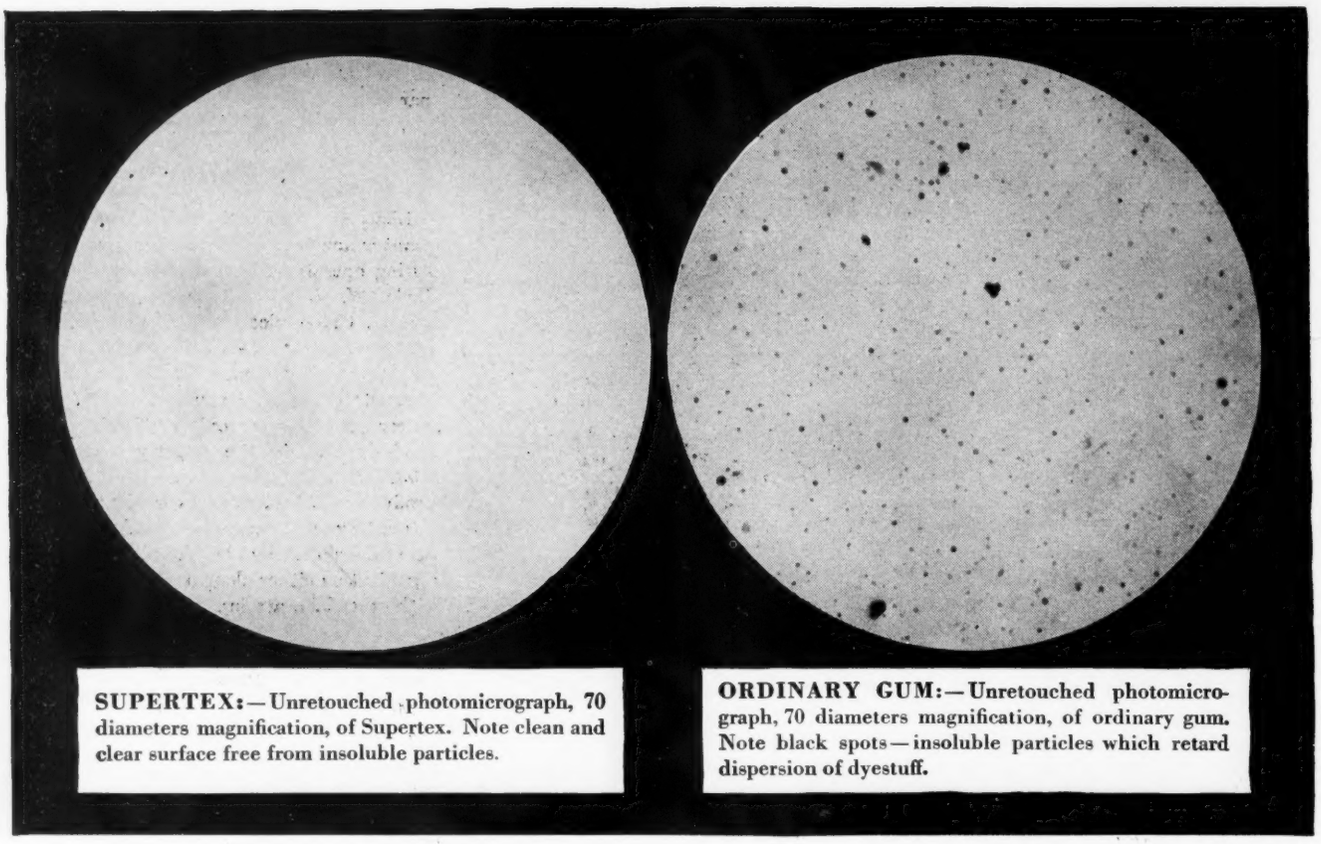
Monsanto Petroleum Chemicals, Inc. has been organized with headquarters in Dayton, Ohio, as an affiliant of Monsanto and the Thomas & Hochwalt Laboratories, Inc., to develop the production of synthetic resins, alcohols and aromatic chemicals from petroleum.

New company will take over the plant and processes of the Dayton Synthetic Chemicals, Inc., which was formed about 4 years ago as a subsidiary of the Thomas & Hochwalt Laboratories, Inc., to exploit the manufacture and uses of petroleum base resins developed through the researches of the Thomas & Hochwalt Laboratories. The officers of Monsanto Petroleum Chemicals, Inc. are Edgar M. Queeny, president, and Charles Allen Thomas, vice-president in charge of operations. All of the research work of the new company will be performed in the laboratories of Thomas & Hochwalt, which will also continue its usual activities as an independent organization in the field of industrial chemical research.

Few Price Changes

The petroleum solvents were without price change during the past month.

Other solvents, acetone, butyl alcohol, butyl acetate, ethyl acetate, etc., were firm and unchanged. Immediate pick-up after Feb. 1 in automobile production



SUPERTEX:—Unretouched photomicrograph, 70 diameters magnification, of Supertex. Note clean and clear surface free from insoluble particles.

ORDINARY GUM:—Unretouched photomicrograph, 70 diameters magnification, of ordinary gum. Note black spots—insoluble particles which retard dispersion of dyestuff.

Here's why Supertex excels!

● The microscope tells the story—*Supertex and ordinary printing gums are manufactured from the same raw materials—but notice the difference. Our patented special process makes Supertex a *thoroughbred* printing gum—so purified and clarified that it suspends dyestuffs and hydrosulphites in a much more finely divided state.

Many printers are fooled by printing gums because certain important characteristics are not visible to the naked eye. They are readily seen under the microscope, particularly after adding a small amount of tint to intensify the denser particles. Supertex is absolutely clear, showing no solid particles, while the ordinary gum contains numerous insoluble materials which, in printing, filter out on the surface of the cloth as illustrated above.

All the impurities of the raw materials which are impossible to convert have been removed from Supertex, resulting in an evenly suspended solution. This feature assures better dispersion of the dyestuff or hydrosulphite, better penetration, and better dyeing of the fibres. These two photographs prove that doctor streaks and scratches on rollers are impossible with Supertex.

Use Supertex for rich, true colors, clear and well defined printing, and complete penetration.

. . .

FREE—Write today for a free sample of Supertex for your own testing with any ordinary printing gum.

*TRADE NAME REGISTERED AND PROCESS PATENTED

JACQUES WOLF & CO.

Manufacturing Chemists and Importers

Passaic, N. J.

Warehouses: **Providence, R. I. • Philadelphia, Pa. • Utica, N. Y. • Chicago, Ill. • Greenville, S. C. • Chattanooga, Tenn.**

schedules and in the Akron tire section, speedily reflected in demand for larger shipments. With most automotive plants sold out beyond February the outlook for heavy lacquer production in the next few months is especially bright.

Coal Tar Chemicals

Coal tar chemical market was featured in the last 30 day period by an insistent demand for benzol, toluol and solvent naphtha. This contrasted with rather modest tonnages in most other items in the group. Call for cresylic acid was smaller than in January.

With automotive production in February at the best levels since 1930 and with the very strong likelihood that this high rate of production would continue well into the Spring months, tire producers were forced to revise their production schedules upward. Continuance of cold weather was responsible for little interest in naphthalene, but the next 30 day period is likely to see the start of the seasonal pick-up. Rayon producers were active. Textile finishing and dyeing operations were slightly curtailed in the last 2 weeks of the month, but this lull is attributed to the in-between seasonal period. Processing of spring goods is about ready to open up. No price changes of importance were reported. March business is expected to exceed February's by a wide margin, specially dyes and intermediates.

Dye Imports in '33

Invoice value of dyes imported into U. S. during '33 increased 36% compared with '32. Imports in '33, entered for consumption, totaled 4,288,214 lbs. valued at $4,791,704 against 3,904,628 lbs. invoiced at $3,516,968 in '32. Dye imports in the past year not only increased in poundage and value but there was seemingly a trend toward purchases of the higher-priced specialties of foreign origin. Imported dyes in '33 accounted for one-fifth by value of U. S. consumption, according to estimates.

American production undoubtedly increased in '33 if consumer activity may be taken as a guide. Predicating estimates upon a domestic sales figure 25% above that of '32 the ratio of imports (duty-paid value) to apparent domestic consumption is 17.5%. If an allowance is made for profit and overhead (estimated by the Tariff Commission at 15%) imports were equivalent to 20% of domestic dye sales consumption. In '33, Germany supplied approximately three-fifths and Switzerland nearly two-fifths of our incoming shipments.

Fertilizers

Ammoniates Higher

Advances in organic ammoniates featured the fertilizer materials market. Talk of further advances in sulfate and nitrate is heard, but as yet nothing definite has been announced in either direction. In some quarters it is felt that each is waiting for the other group to make the first move. The exceptionally cold weather prevailing through February has undoubtedly hindered the sale of fertilizer materials. The industry generally is concerned over the Bankhead bill and it is felt that its passage would mean considerable curtailment in the use of fertilizer in the South.

Ober With N. F. A.

Douglas Ober, formerly treasurer of G. Ober & Sons Co. of Baltimore, and a member of that firm since 1909, began work for N.F.A. on Feb. 19. He will handle principally the collection and preparation of information concerning the operation of the Code and the dissemination of such information among members of the industry and to the public. Mr. Ober attended the Gilman Country School, Baltimore, was graduated from Princeton with the class of '09. He was in the aviation branch of the army during the World War.

Lower Ga. Freight Rates

Georgia Public Service Commission, despite the fact that it has not yet finally concluded its investigation into freight rates for fertilizer and fertilizer materials, has ordered an immediate reduction of 27% in rates on all fertilizer and fertilizer materials on intrastate shipments.

French Buy U. S. Nitrate

French have agreed to grant to the American producer of synthetic sodium nitrate a contract for 40,000 tons for quick delivery, it was learned recently. This represents a value of about $1,250,000, and constitutes a substantial part of France's total imports of nitrates.

T. V. A. Fertilizer

T. V. A. fertilizers will be scientifically tested by the agricultural experiment stations of the 7 Tennessee Valley States, it was announced recently by Director H. A. Morgan of the Authority, following a meeting at the Tennessee agricultural experiment station.

New Companies

Blount Fertilizer, Bethel, N. C., has been formed with $100,000 capitalization authorized. J. H. Blount, Greenville, is a stockholder. Douglas C. Davies, formerly of Garrigues, Stewart & Davies, has established a brokerage business at 143 Liberty st., N. Y. City. Eastern & Western Fertilizer has been chartered at Grasonville, Md.

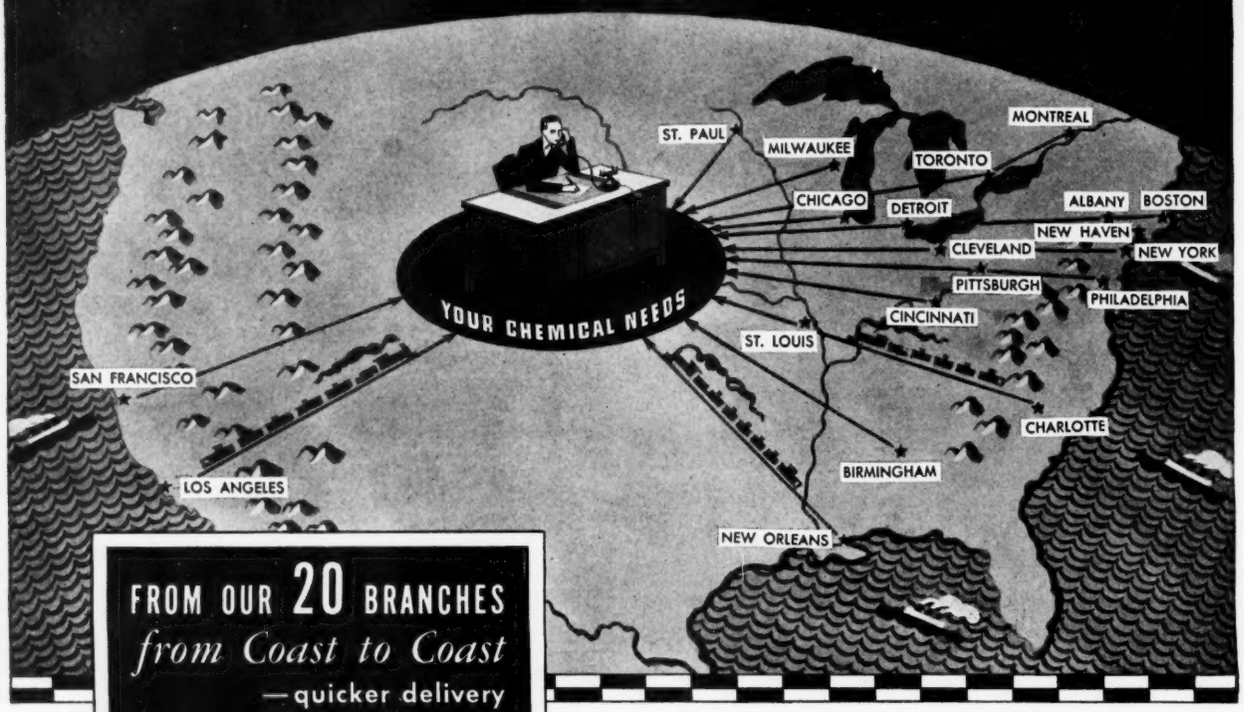
Below are various countries of destination with quantities (metric tons) of Egyptian phosphates exported:

Fertilizer Materials, Principal Selling Points

Product	*N. Y.*		*Chicago*		*Baltimore*		*Atlanta*		*San Francisco*	
	Jan. 31	*Feb. 28*	*Jan. 31*	*Feb. 28*	*Jan. 31*	*Feb. 28*	*Jan. 31*	*Feb. 28*	*Jan. 29*	*Feb. 27*
Ammonium sulfate, bulk, dom	$25.00p	$25.00			$25.00p	$25.00	$25.00p	$25.00	$29.00p	$29.00
Ammonium sulfate, imported	25.00p	25.00			25.00p		25.00p		29.00p	29.00
Blood, dried, domestic	2.75p	3.25	$ 2.50	2.75	2.75*	3.00	2.50‡		2.50	2.50
Blood, dried, imported	2.90p	3.10			2.90p		2.90p	3.25	2.90†	3.00
Bone Raw, 4½ & 50			21.00	22.00	28.00	26.00			25-27	24.00
Bone steamed, 1¼ & 60			16.00	16.00					26-31	23-25
Bone 3 & 50 meal			17.00	18.00	26.00	25.00				
Bone, South America, to arrive	25.50p	25.50								
Castor Pomace, dom.	17.50pp	17.50	17.50pp	17.50	17.50pp	17.50	17.50pp	17.50		
Castor Pomace, imp.	21.00p	18.50			21.00p	18.50	21.00p	18.50		
Cyanamid	1.07½d	1.07½	1.07½		1.07½d		1.07½d	1.07½		
Fish scrap, unground					2.90-10	3.15-10				
Fish meal					42.00	42.43	None	3.25 & 10	34-30-29§	33-30-29
Garbage, tankage					9-9.50	None				
Hoof meal, dom.			2.20							
Nitrogenous material	2.60pp	3.15	1.90pp	2.25	2.60pp	2.90	2.20-10†			
Nitrogenous material, imp.	2.75p	2.90			2.75†	2.75†	3.00			
Sodium nitrate	24.50p	24.50			24.50p	24.50	24.50p	24.50	26.00p	26.00
Superphosphate, 16%					8.00	8.00	12.10-10.90**	12.10-10.90c	.85 unit	0.85unit°
Tankage			1.85&10	2.35&10	2.50&10*	3.00&10	2.20&10‡	2.70&10	2.75&10	2.80 & 10
Tankage, imp.	3.00 & 10d	2.75 & 10			3.00&10d	3.00&10d	2.90&10p	3.25&10	3.00&10†	2.90 & 10

pPorts; p.p.Production points; dDelivered; *c.a.f.Baltimore; †c.i.f. Ports; ‡f.o.b. Chicago; **Higher price interin points, lower price coast quotation; §1st price f.o.b. Monterey; 2nd price $30 San Francisco; 3rd price $29 c.i.f. Pacific Coast ports. (Japanese materials) °Jap material 75c per unit c.i.f. Pacific Coast ports, prompt shipment.

SERVICE
BY GRASSELLI



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Concrete Highways	Leather	Sugar
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Electrical Devices	Paper	

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What are your needs? Write, wire or phone our nearest branch for prompt service

THE Grasselli Chemical Company affords its customers the exceptional shipping facilities of 20 branches and warehouses—as well as a number of works. As these are located all over the country, there is sure to be one near you. This convenient proximity means quicker delivery and economy of freight rate for you. Write for our booklet.

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CLEVELAND INCORPORATED OHIO

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Milwaukee New Haven New Orleans Philadelphia Pittsburgh St. Louis St. Paul
San Francisco, 584 Mission Street Los Angeles, 2260 East 15th Street

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Acids and General Chemicals Division—Montreal and Toronto

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A standard held high for 95 years

	1931	1932
Belgium	24,915	23,000
British India	9,485	6,760
France	.....	28,620
Germany	15,000	.....
Great Britain	4,105	8,570
Greece	4,300	8,340
Holland	5,865	.....
Italy	29,400	80,740
Japan	107,195	233,325
Portugal	.....	26,435
Sweden	.....	4,990
	200,265	420,780

For the month of January imports of fertilizer and fertilizer materials were 49% larger than those for January, '33, and about 58% larger than for January, '32. Exports were about 8% larger than those for January, '33, but were about 24% smaller than those for January, '32.

January Fertilizer Tag Sales

Equivalent short tons

South—	January P.C. of 1933	January 1934	January 1933	January 1932	December-January P.C. of 1932-33	December-January 1933-34	December-January 1932-33	December-January 1931-32
Virginia*	184	32,134	17,438	10,746	179	35,552	19,838	11,296
North Carolina	185	113,263	61,365	49,020	177	145,919	82,431	53,368
South Carolina	261	81,411	31,170	17,550	271	113,934	42,015	23,575
Georgia	426	35,927	8,427	5,400	611	56,797	9,292	6,121
Florida*	86	46,938	49,977	59,825	106	102,878	96,899	107,775
Alabama	170	20,450	12,050	12,550	239	33,300	13,950	14,150
Mississippi	116	8,175	7,025	1,000	326	25,825	7,925	2,450
Tennessee*	52	1,365	2,610	587	56	1,465	4,612	587
Arkansas†	476	5,710	1,200	1,400	505	6,060	1,200	2,450
Louisiana†	162	9,811	6,050	5,280	263	16,411	6,250	7,480
Texas*	93	6,940	7,445	8,115	129	9,646	7,495	9,535
Oklahoma	107	750	700	250	107	750	700	250
Totals, South	175	358,874	205,457	171,723	189	548,537	290,607	239,037
Midwest—								
Indiana	39	625	1,594	594	44	731	1,656	644
Illinois	273	153	56	1,073	518	430	83	2,488
Kentucky	55	2,625	4,785	3,721	55	2,625	4,785	3,744
Missouri	1,662	881	53	197	173	883	154	321
Kansas	700	35	5	.....	125	40	32	152
Totals, Midwest	67	4,319	6,493	5,585	70	4,709	6,710	7,346
Grand totals	171	363,193	211,950	177,308	186	553,246	297,317	246,383

*Cottonseed meal sold as fertilizer included.
†Excludes 10,300 tons of cottonseed meal for December-January combined, but no separation is available for the amount of meal used as fertilizer from that used as feed.

United States Imports and Exports of Fertilizer and Fertilizer Materials By Classes—Total for All Countries—Long Tons

(Summarized by The Nat'l Fertilizer Ass'n from Dept. of Commerce preliminary reports)

IMPORTS

	January 1934°	January 1933	January 1932	December-January 1933-34	December-January 1932-33	December-January 1931-32
Ammonium sulfate	42,510	38,644	19,187	65,311	53,869	41,070
Ammonium-sulfate-nitrate	0	0	75	1	0	2,542
Calcium cyanamide	7,822	9,461	5,190	18,208	14,118	7,870
Calcium nitrate	3,351	3,334	1,429	4,152	4,984	2,321
Guano	18	320	2,209	1,693	2,753	3,283
Dried blood	203	128	708	331	629	1,098
Sodium nitrate	33,690	405	34,134	57,198	453	51,163
Urea and calurea	576	381	946	678	596	1,839
Ammonium phosphates	233	111	*	709	111	*
Tankage	654	1,601	1,966	1,922	4,166	3,528
Other nitrogenous	6,452	950	217	11,500	4,416	4,017
Total nitrogenous materials	95,509	55,335	67,061	161,703	86,095	118,731
Bone phosphates	2,221	2,457	3,670	3,761	5,937	7,065
Superphosphates	1,300	1,399	1,847	1,589	2,849	2,336
Phosphate rock	0	2,100	0	0	2,100	0
All other phosphates	0	0	0	0	0	0
Total phosphate materials	3,521	5,956	5,517	5,350	10,886	9,401
Muriate of potash	9,739	6,751	4,290	23,705	8,106	10,579
Kainite, 14%	1,738	4,135	2,311	11,777	7,407	3,006
Kainite, 20%	11,286	2,552	‡	23,775	‡	‡
Manure salts, 30%	8,491	9,133	3,631	18,416	12,729	7,418
Sulfate of potash	2,517	1,727	1,986	5,611	3,844	3,208
Sulfate of pot. magnesia	2,768	318	*	4,511	*	*
Nitrate of potash	696	349	*	1,039	*	*
Other potash	7	3	27	8	10	32
Total Potash materials	37,242	24,968	12,245	88,842	32,096	24,243
Nit-phos-& pot. fertilizers	508	544	108	597	931	599
Other fertilizers	3,547	7,564	4,136	7,978	12,319	6,847
Grand total	140,327	94,367	89,067	264,470	142,327	159,821

EXPORTS

Ammonium sulfate	1,115	146	7,725	3,404	195	12,457
Other nitrogenous chemicals†	7,785	8,244	11,813	19,435	25,086	11,813
Nitrogenous organic waste	1,327	439	62	4,212	1,733	306
Total nitrogenous materials	10,227	8,829	19,600	27,051	27,014	24,576
High grade hard rock	4,400	2,964	11,035	4,400	3,142	24,298
Land pebble rock	41,962	40,307	44,237	96,141	89,290	84,389
Total phosphate rock	46,362	43,271	55,272	100,541	92,432	108,687
Superphosphates	781	752	2,618	5,138	3,779	8,187
Other phosphate materials	1,161	105	310	2,512	231	539
Total phosphate materials	48,304	44,128	58,200	108,191	96,442	117,413
Potash fertilizers	1,192	2,470	1	3,787	2,938	8,226
Concentr'd chem. fertilizers	656	722	1,419	2,618	818	2,373
Prepared fertilizer mixtures	11	14	22	142	87	222
Grand Total	60,390	56,163	79,242	141,789	127,299	152,810

*Not previously stated separately.
‡Included in kainite, 14%.
†Chiefly domestic synthetic sodium nitrate.
°See discussion at end of preceding page (Page 8) of this letter.

Textile Chemicals

The '34 Summer Woolen Card, comprising a special collection of 10 new shades, has just been sent out by the Textile Color Card Association to its members. This supplementary woolen card, first of its kind to be issued by the Association, constitutes an additional service to members.

Gulick Re-Elected

National Oil Products' president, C. P. Gulick, was reelected president of the Sulphonated Oil Manufacturers' Association. Vice-President, C. M. Braham, Arkansas Co., and Secretary-Treasurer, H. B. Sweatt, were also reelected. Directors are: C. P. Gulick, V. H. Berman, J. G. Nathanson, C. M. Braham, D. S. Whiteman, H. B. Hooper, H. T. N. Smith, F. C. Scholler, John C. Wolke, C. D. Marlatt, A. E. White, and G. J. Desmond. Executive Committee: C. P. Gulick, C. D. Marlatt, V. H. Berman, C. M. Braham, and J. C. Wolke.

Price Fixing Investigation

Investigation into alleged price fixing in the domestic viscose rayon yarn industry, dating back to October, 1931, has culminated in the issuance by the Federal Trade Commission of a formal complaint against 10 companies engaged in the manufacture of this commodity.

Group includes the Viscose Co., du Pont Rayon, Tubize Chatillon, Industrial Rayon, American Glanzstoff, American Enka, all of New York; Skenandoa Rayon Utica, N. Y.; Delaware Rayon, Newcastle Del.; Acme Rayon, Cleveland, and Belamose, Rocky Hill, Conn.*

Wolf's New Process

Jacques Wolf research division has perfected "one bath degumming and dyeing operation" for silk hosiery. This method requires one hour and increases the production in lbs. per hour per day, at the same time maintaining the quality of the finished product. Process is based upon the liberation of Sericin B fraction of silk gum, which has powerful emulsifying, penetrating and levelling ability. It is the result of a research and perfecting period of 2 years. Boil-off oil used in the process contains properly buffered, peptizing salts and the conditioning agent used is Wolf Monopole Oil. Latter renders the dyed hose to the proper condition for boarding, especially those having tightly packed stitches of cotton or rayon in the foot and heel splicing.

*Only one company has filed an answer, others have requested more time.

Important Price Changes

	Feb. 28	Jan. 31
ADVANCED		
Egg yolk	$0.44	$0.42
Mangrove bark	30.00	29.00
Myrobalans, R2	16.75	17.00
DECLINED		
Valonia, beards	$39.00	$40.00

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The Financial Markets

Stocks Show Slight Net Loss For Month — Alcohol Stocks Down Sharply — Monsanto Stockholders To Vote On Increase Of Capital Stock.

After 3 months of steady appreciation stocks declined slightly in February, loss amounting to approximately 3%. Reaction late in the month wiped out most of the early gains. Prices moved irregularly in the last 3 weeks of the month, indicating that the recent upward movement, which started in mid-January and lasted through the 1st week of February, was definitely over. February's loss amounted to $643,568,365 (*N. Y. Times* list of 240 key stocks), comparing with a gain of $2,268,904,469 in January. In most quarters the reaction was not viewed with alarm. Rather, it was explained as simply corrective. Some of the unsettlement was traced, however, directly to the controversies raging over the regulatory stock exchange bill and to the sudden and unexpected cancellation of the air-mail contracts. On the favorable side the continued improvement in business helped to minimize the decline.

Large Net Loss in Chemicals

Following table shows the net changes in the 20 groups recorded by the *Times*. Average net change in points in the chemical group, amounting to a loss of 2.778, was the largest in any of the 20 groups and compared with a loss of but .539, the average for the 240 issues.

Group and Number of Issues	*Avr. Net Ch'g in Points*	*Change in Values*
Amusements (5)	+ .300	+ $1,222,799
Building equip. (9)	—1.861	— 26,988,529
Business equip. (4)	—1.375	— 13,638,430
Chain stores (14)	+ .223	+ 23,512,207
Chemicals (9)	**—2.778**	**— 76,681,226**
Coppers (15)	+1.350	— 15,094,189
Dept. stores (10)	+1.337	— 2,745,229
Foods (19)	—1.895	—135,038,475
Leathers (4)	— .375	— 280,135
Mail order (3)	+1.792	+ 11,260,079
Motors (15)	— .567	— 63,399,399
Motor equipment (7)	— .303	— 2,456,783
Oils (22)	— .642	—144,330,613
Public utilities (29)	— .164	— 14,991,046
Railroads (25)	—1.605	—102,623,003
Railroad equipment (8)	— .219	— 13,848,392
Rubber (6)	— .792	— 5,615,153
Steels (13)	+ .634	— 18,716,845
Sugars (9)	— .555	— 6,887,746
Tobaccos (14)	—1.107	— 36,228,257
Average and total 240 issues	— .539	— $643,568,365

All stocks in the *Times* chemical group sold off in February, but the severest losses were sustained by the so-called alcohol stocks. U. S. I.'s net loss for the month was 7½ points and Commercial Solvents declined even more—8⅜ points. Feeling in the Street turned distinctly bearish on the alcohol group in February. Consumption of hard liquor is not reaching the proportions expected, liquor prices are more than likely to go much lower. Only fractional losses were sustained by a number of the leading industrial chemical stocks.

Net Decline in Chemical Group

Net loss in the chemical group, amounting to $76,681,226, compares with a gain of $136,153,982 for January, and leaves a net appreciation of $59,472,756 for '34 to date. February, '33 loss totaled $168,411,582.*

Allied Chemical & Dye	$1,800,966
Commercial Solvents	22,094,816
Du Pont de Nemours	7,303,555
Mathieson Alkali Wk	1,626,090
Texas Gulf Sulphur	4,127,500
Union Carbide & Carb	36,907,748
U. S. Industrial Alcohol	2,934,285
Virginia-Carolina Chem	*60,183
Westvaco Chlorine Prod	*53,651
Total	— $76,681,226

Devoe & Raynolds' Extra

Devoe & Raynolds has declared an extra dividend of 25c on its Class A and B common in addition to the regular quarterly distribution of 25c on common and $1.75 on the 1st and 2nd preferred, all payable April 2 to stock of record March 21. Three months ago an extra of 25c was paid on the common and the regular 25c quarterly payment resumed. Wayne Johnson, of the law firm of Johnson & Shores, has been elected a director to succeed James A. Vaughan, resigned. Other retiring directors were reelected.

Glidden Pays 25c

Glidden has declared a quarterly dividend of 25c on the common stock, establishing a $1 annual basis. Last quarte paid a dividend of 25c on the common. Company also declared regular quarterly dividend of $1.75 on prior preference stock. Both dividends are payable April 2 to stock of record March 14. A quarterly dividend of 50c a share was declared by directors of Hercules payable on March 24 to stock of record March 13. Previously company had paid 37½c a share quarterly, and 3 months ago an extra of 75c a share was paid.

Monsanto Capitalization

Monsanto Chemical is notifying stockholders that at the annual meeting on March 27, directors will submit a proposal to increase authorized capital stock of the company from 500,000 to 1,250,000 shares.

Writes an eventful annual report—Monsanto president, Edgar M. Queeny

There also will be submitted a proposal to capitalize $4,320,000 of the paid-in surplus of the company and to distribute the additional stock thus created among Monsanto stockholders on a share-for-share ratio.

Edgar M. Queeny, president, stated it was the intention of the board, in event the proposed changes in capital stock are approved, and if future operations justify it, to pay dividends at the rate of 25c a share quarterly on the increased capitalization, which would be equivalent to $2 a share on the present capitalization, instead of $1.25, which it is now paying.

Davison Receivers Win

Judge W. Calvin Chesnut has allowed claims of $3,615,108 against Silica Gel to receivers for Davison Chemical. Evidence in the case was heard in January.

Price Trend of Chemical Company Stocks

	Close Jan. 31	*Feb. 2*	*Feb. 9*	*Feb. 16*	*Feb. 23*	*Close Feb. 28*	*Net Gain or Loss*	*1934 High*	*1934 Low*	*1933 High*	*1933 Low*
Allied Chem...	152¾	153½	150½	158	155½	152	— ¾	160¾	144	152	70¾
Air Reduction	102	101½	102	102⅜	101¾	98½	—3½	106¼	95½	112	47½
Anaconda....	16	17	15¾	16¾	15⅞	14¾	—1¼	17⅝	15½	22⅞	5
Col. Carbon..	66⅝	67⅛	67	69¾	67¾	66	— ⅜	71	58	71½	23⅛
Com. Solvent.	35⅝	34¼	31⅛	30⅜	28¾	27¼	—8⅜	36¾	26½	57¼	9
duPont.....	99½	100¼	98⅝	102⅝	101⅛	98⅞	— ⅝	103⅞	90⅝	96⅜	32⅛
Mathieson....	38	37¾	36⅛	38¼	37⅛	35½	—2½	40¾	32¼	46⅝	14
Monsanto....	80	79¼	78½	79½	79½	77¾	—2¼	86⅞	75	83	25
Std. N. J.....	47⅛	48⅛	47¼	48⅞	47¾	46½	— ⅝	50⅛	44¼	47½	22¾
Texas Gulf S..	39¾	39⅞	40⅜	41⅝	39½	38⅛	—1⅝	43¼	37¾	45¼	15¼
U. S. I.....	59¾	60⅛	61¾	58	55½	53	—6¾	64¾	52	94	13½

*Total value of all chemical stocks on the N. Y. Stock Exchange on March 1 amounted to $3,731,323,629 compared with $3,838,756,912 on Feb. 1. Average price on March 1 was $52.48 compared with $53.69 on Feb. 1.

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Standard Quality

Judge Chesnut said award included sums advanced by Davison Chemical to Silica Gel. Court held that simple interest at 6% was alone collectible, refusing plaintiff's claim for compound interest.

Silica Gel's defense contended that sums were not payable because of an unwritten agreement between officials of Silica Gel and Davison Chemical, both in receivership, to the effect that the sums were not loans but were advances to be paid back out of profits. It was also contended that claims of Davison were subordinate to other creditors.

Better Outlook For Earnings

"With the prevailing higher prices on carbon black and on the basis of the present satisfactory gas deliveries," states Oscar Nelson, president of United Carbon, in the annual report, "the management expects the current year to show a considerable improvement in earnings over those of last year."

Tonnage sales of carbon black registered a new high record in '33, with shipments 63% ahead of those for '32, says Mr. Nelson, adding that United expanded its trade position, supplying about 27% of all carbon black consumed. Practically all the company's idle plants are being placed in operation again to meet the growing demand. United has the largest quota of any producer in the Carbon Black Export, Inc., organized under the Webb act.

Celluloid Has Net Profit

Celluloid and subsidiaries for year ended Dec. 31, '33, certified by independent auditors, shows net profit of $143,986 after depreciation, taxes, etc., equivalent to $6.03 a share on 23,882 no-par shares of $7 cumulative first preferred participating stock, on which no dividends have been paid since Dec. 1, 1930. This compares with net loss of $399,180 in '32. Current assets as of Dec. 31, '33, amounted to $3,408,332 and current liabilities were $139,459 compared with $3,359,819 and $67,361, respectively, at end of preceding year. Cash, time deposits and marketable securities, at cost, totaled $1,039,274 at close of '33, against $1,110,176 on Dec. 31, '32.

J. S. Young Reports

J. S. Young Co. (licorice extract and tanning material), Baltimore, reports net profit for Dec., '33, of $160,936, after charges and Federal taxes, as compared with $178,086 for the corresponding period of '32. Earnings for December are equivalent, after dividends on the 7% preferred stock, to $7.36 a share on the 14,746 shares of common stock outstanding, as against $7.20 a share on the 15,000 shares of common in Dec., '32. Current assets on Dec. 31 last were $893,782 and current liabilities $72,126, as contrasted with $1,933,601 and $64,477 for Dec., '32.

Dividends and Dates

Name	Div.	Stock Record	Payable
Abbott Labs. ext...	$0.10	Mar. 15	Apr. 1
Allied Chem. & Dye pf.....	$1.75	Mar. 9	Apr. 2
Am. Glanzst. ($50 pr pf.).....	.75	Mar. 23	Apr. 1
Amer. Glanzstoff 7% pf.....	$1.75	Mar. 23	Apr. 1
Amer. Glanzstoff 7% pfd. acc.....	$14.00	Mar. 23	Apr. 1
Amer. Home Prods.	.20	Mar. 23	Apr. 1
Amer. Smelt & Ref. 7% pf. acc.....	$2.50	Feb. 2	Mar. 1
Archer-Daniels-Midland.....	.25	Feb. 17	Mar. 1
Atlas Powder.....	.50	Feb. 28	Mar. 10
Celanese 7% cum. pt pf acc.....	$4.00	Feb. 16	Mar. 2
Colgate-Palmolive-Peet pf.....	$.150	Feb. 15	Mar. 1
Col. Carbon (vtc.).	.50	Feb. 16	Mar. 1
Col. Carbon (vtc.). ext.....	.25	Feb. 16	Mar. 1
Devoe-Reynolds A & B.....	.25	Mar. 21	Apr. 2
Devoe & Reynolds A & B ext.....	.25	Mar. 21	Apr. 2
2nd pf.....	$1.75	Mar. 21	Apr. 2
duPont, com.....	.50	Feb. 28	Mar. 15
duPont, deb.....	$1.50	Apr. 10	Apr. 25
Eastman Kodak...	.75	Mar. 5	Apr. 2
Eastman Kodak, pf	$1.50	Mar. 5	Apr. 2
Freeport Texas....	.50	Feb. 15	Mar. 1
Freeport Texas pf..	$1.50	Apr. 13	May 1
Glidden Co.....	.25	Mar. 14	Apr. 2
Glidden Co pr pref.	$1.75	Mar. 14	Apr. 2
Hercules Powder...	.50	Mar. 13	Mar. 24
Heyden Chemical..	.25	Feb. 23	Mar. 1
Heyden Chemical ext.....	.10	Feb. 23	Mar. 1
Heyden Chem. pf...	$1.75	Mar. 20	Apr. 2
Industrial Rayon..	$1.25	Mar. 15	Apr. 1
Int'l Nickel.....	.10	Mar. 1	Mar. 31
International Salt..	.37½	Mar. 15	Apr. 2
Koppers Gas & Coke, pf.....	$1.50	Mar. 12	Apr. 2
Mathieson Alkali..	.37½	Mar. 8	Apr. 2
Math. Alkali, pf...	$1.75	Mar. 8	Apr. 2
Merck Corp., pf....	$2.00	Mar. 17	Apr. 2
Monroe Chemical..	.50	Mar. 18	Mar. 20
$3.50 pf.....	.87½	Mar. 15	Apr. 2
Monsanto Chem...	.31¼	Feb. 24	Mar. 15
National Lead.....	$1.25	Mar. 16	Mar. 31
National Lead pf B	$1.50	Apr. 20	May 1
National Lead, pf A	$1.75	Mar. 2	Mar. 15
Paraffine Co.....	.50	Mar. 17	Mar. 27
Patterson-Sargent..	.12½	Feb. 15	Mar. 1
Penick & Ford.....	.50	Mar. 1	Mar. 15
Pittsburgh Plate Glass.....	.25	Mar. 10	Apr. 2
Pittsburgh Plate Glass ext.....	.10	Mar. 10	Apr. 2
Pratt & Lambert...	.25	Mar. 15	Apr. 2
Proctor & Gamble 5% pf.....	$1.25	Feb. 23	Mar. 15
Sherwin-Williams pf	$1.50	Feb. 15	Mar. 1
Spencer Kellogg & Sons.....	.25	Mar. 15	Mar. 31
Texas Gulf Sulphur	.50	Mar. 1	Mar. 15
Union Carbide & Carbon.....	.25	Mar. 9	Apr. 2
Vulcan Detinning pf	$1.75	Apr. 10	Apr. 20
Vulcan Detinning pf	$1.75	July 10	July 30
Vulcan Detinning spec.....	$3.00	Apr. 10	Apr. 20
Westvaco Chlorine.	.10	Feb. 15	Mar. 1
Westvaco Chlorine, pf.....	$1.75	Mar. 15	Apr. 2

Annual and Special Meetings

	Record Date	Meeting Date
Air Reduction.....	Feb. 28	Mar. 14
Amer. Smelt & Refg.....	Mar. 13	Apr. 3
Atlas Powder.....	Feb. 27	Mar. 20
Corn Products.....	Mar. 6	Mar. 27
duPont (spec.).....	Feb. 1	Mar. 12
Eastman Kodak.....	Mar. 3	Apr. 3
Freeport Texas.....	Feb. 15	Mar. 12
General Printing Ink.....	Feb. 1	Mar. 6
Hercules Powder.....	Feb. 27	Mar. 20
Int'l Nickel.....	Mar. 1	Mar. 27
Int'l Salt.....	Feb. 27	Mar. 19
Monsanto Chemical.....	Feb. 24	Mar. 27
Penick & Ford.....	Mar. 7	Mar. 27
Westvaco Chlorine.....	Feb. 15	Mar. 28

United Carbon Pref. Dividend

United Carbon has declared the regular semi-annual dividend of $3.50 on the preferred, payable July 1 to stock of record June 16.

Accumulations Voted

Smith-Alsop Paint & Varnish directors have declared a dividend of 87½c per share on account of accumulations on the 7% cum. pref. stock, par $50, payable April 1 to holders of record March 1. Last regular quarterly payment of this amount was made on the pref. stock on Dec. 1, 1932; none since.

Glanzstoff Clears Accumulations

American Glanzstoff directors on Feb. 16 declared a dividend of $14 per share to clear up all arrearages on the 7% cum. pref. stock, par $100, in addition to the regular quarterly dividend of $1.75 per share on the same issue, both payable April 1 to holders of record March 23. Quarterly distributions of $1.75 per share were made on the 7% pref. stock on Jan. 1 last and on Oct. 1 1933. Payment on the latter date was the first made since July 1, 1931.

Directors also declared the usual quarterly dividend of 75c per share on the prior pref. stock, par $50, payable April 1 to holders of record March 23.

Heyden Pays 10c Extra

Heyden Chemical directors declared an extra dividend of 10c per share in addition to the usual quarterly dividend of 25c per share on the common stock, par $10, payable Mareh 1 to holders of record Feb. 23.

Industrial Rayon Dividend

Industrial Rayon directors on Feb. 21 declared a dividend of $1.25 per share on the common stock, no par value, payable April 1 to holders of record March 15. Distributions of $1 per share were made on this issue on Jan. 16 last and on Oct. 1 '33, as compared with 75c per share paid on July 1 '33 and 50c per share each quarter from Oct. 1 '32 to and inclusive April 1, '33.

Over the Counter Prices

	1933 Dec. 30		1934 Jan. 31		Feb. 28	
American Dry Ice,	...	...	1¾	4	1½	3½
American Hard Rubber.....	6	10	6½	10	9½	13½
Canadian Celanese, com.....	...	...	18	20	18½	20¼
Canadian Celanese, pfd.....	...	...	104½	107½	105	107½
Dixon Crucible....	34	38	40½	44½	46	50½
Merck, pfd.....	104	107	107½	111	116	120
Tubize Chat., 7%, cum. pfd.....	...	...	57	...	60	65½
Worcester Salt....	...	...	49	53	49¼	53
Young, J. S. pfd....	83	...	85	...	85	...
Young, J. S. com...	56	...	60	65	63	...
Intr'nat. Salt 5's, '51	...	...	89½	91½	92	94½

Foreign Markets

London	1933 Dec. 30*	1934 Jan. 31	Feb. 28
British Celanese....	13s 6d	13s 1½d	14s 4½d
Celanese.....	£7	£8½	£8
Courtaulds.....	£2⅛	£2⅛	£2⅝
Distillers.....	81s 3d	85s 6d	87s 3d
I. C. I.....	32s 1½d	32s 9d	35s 4½d
Unilever, ord.....		£1¼	£1¼
Un. Molasses.....	1½d	21s 3d	24s
Paris			
Kuhlmann.....	683	610	
L'Air Liquide.....	759	720	730
Berlin			
I. G. Farben.....	123	125	135
Milan			
Snia Viscosa.....		229½	239½
Montecatini.....	130½	135½	140

*London prices Dec. 29.

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Earnings at a Glance

Company	Annual Dividends	Net Income 1933	Net Income 1932	Common Share Earnings 1933	Common Share Earnings 1932
Abbott Laboratories: Year, December 31	$2.00	$549,578	$298,384	$3.79	$2.05
Acetol Products: Year, December 31	f....	†31,818	†12.172	....	....
American Com'l Alcohol: December 31 quarter	f....	971,832	181,616	h3.72	h.93
wYear, December 31	f....	1,190,346	586,438	h4.56	h3.01
American Maize-Products: Year, December 31	z.50	721,144	388,345	2.40	1.29
American Metals Co., Ltd.: Year, December 31	f....	103,217	†2,256,630	p1.55	....
Canadian Celanese: Year, December 31	f....	1,260,864	718,881	....	....
Canadian Industries: Year, December 31	§3.50	3,430,475	2,771,662	4.63	3.65
Celluloid Corp.: Year, December 31	f....	143,986	†399,180	t6.03	....
Colgate-Palmolive-Peet Co.: Year, December 31	f....	373,398	53,301	p1.50	p.21
Commercial Solvents Corp.: December 31 quarter	.60	1,048,480	.....	.40	....
Year, December 31	.60	2,327,846	1,282,343	h.88	h.50
Freeport Texas Co.: Year, December 31	2.00	2,478,839	2,005,098	j3.14	2.75
General Paint Corp.: Year, November 30	f....	51,062	†291,129	....	....
General Printing Ink Corp.: Year, December 31	z.15	503,683	213,223	1.47	p5.42
International Salt Co.: Year, December 31	1.50	490,709	514,684	2.04	2.14
Liquid Carbonic Corp.: December 31 quarter	§1.00	†130,932	†384,198	....	....
Monroe Chemical Co.: Year, December 31	z.50	153,467	155,410	.57	.53
National Lead Co.: Year, December 31	5.00	3,828,329	2,711,604	j6.98	j2.92
New Jersey Zinc Co.: December 31 quarter	2.00	1,108,783	417,790	.56	.21
Year, December 31	2.00	3,994,072	2,013,120	2.03	1.02
Penick & Ford, Ltd., Inc.: Year, December 31	§2.00	1,443,647	915,820	h3.70	h2.29
St. Joseph Lead Co.: Year, December 31	f....	†1,161,135	†2,894,022	....	....
United Carbon Co.: Year, December 31	1.60	‡636,217	‡145,643	....	....
U. S. Gypsum Co.: Year, December 31	1.00	1,738,927	1,599,416	h1.00	h.86
Westvaco Chlorine Products: Year, December 31	.40	463,164	381,222	1.08	.79
Young Co., J. S.: Year, December 31	6.00	160,936	178,086	7.36	7.20

fNo common dividend; hOn shares outstanding at close of respective periods; zLast dividend declared, †Net loss; §Plus extras; jOn average shares; ‡Profit before Federal taxes. tOn preferred.

Mathieson Doubles Net Income in '33

Mathieson Alkali for year ended Dec. 31, '33, certified by independent auditors, shows net income of $1,224,078 after depreciation, depletion, obsolescence and federal taxes, equivalent after dividend requirements on 7% preferred stock, to $1.70 a share on 623,263 no-par shares of common, outstanding at end of year. This compares with $729,505 or 86c a share on 650,436 common shares of '32.

Current assets as of Dec. 31, '33, including $1,119,310 cash, amounted to $3,252,965 and current liabilities were $787,067, compared with cash of $731,958, current assets of $2,719,955 and current liabilities of $558,467 at end of preceding year. Income account for year '33 compares as follows:

	1933	1932	1931	1930
Earn fr. oper.	$2,554,414	$1,861,324	$2,603,392	$3,484,409
Depr., depl & obsol	1,137,521	1,143,485	1,146,442	1,204,209
Net fr oper	$1,416,893	$717,839	$1,456,950	$2,280,200
Inc chgs (net)	28,588	†39,262	†53,676	†53,198
Profit	$1,388,305	$757,101	$1,510,626	$2,333,398
Federal tax	164,227	27,596	116,519	237,391
Net income	$1,224,078	$729,505	$1,394,107	$2,096,007
Pfd divs	166,876	168,945	173,005	173,250
Com divs	934,989	1,056,986	1,300,802	1,300,762
Surplus	$122,213	*$496,426	*$79,700	$621,995

*Deficit. †Credits.

Monroe Chemical in report for year ended Dec. 31, '33, certified by independent auditors, shows net profit of $153,467 after depreciation and federal taxes, equivalent after dividends on the $3.50 no-par preference stock, to 57c a share on 126,000 no-par shares of common. This compares with $155,410 or 53c a common share in '32. Current assets as of Dec. 31, '33, amounted to $533,203 and current liabilities were $68,544 compared with $487,294 and $63,976, respectively, at end of preceding year.

Monsanto Earnings Best In History

Monsanto Chemical Co. and subsidiaries for year ended Dec. 31, '33, certified by independent auditors, shows net profit of $2,221,207 after depreciation, research expense, interest, federal taxes, etc., equivalent to $5.14 a share (par $10) on 432,000 shares of capital stock, including 34,486 shares held for exchange of stock of predecessor corporation. This compares with $1,012,698, or $2.37 a share, on 427,197 shares in '32. The '33 earnings are the largest in the company's history.

Current assets as of Dec. 31, '33, including $2,305,643 cash and marketable securities at quoted values, amounted to $7,191,303 and current liabilities were $1,874,762, compared with cash and marketable securities of $2,566,954, current assets of $6,393,261 and current liabilities of $1,117,591 at end of preceding year.

Consolidated income account for year '33, compares as follows:

	1933	1932	1931	1930
Gross profit	$5,386,262	$3,760,821	$4,296,002	$3,677,771
Sel l& adm exp	1,465,664	1,176,186	1,320,293	1,484,595
Depr & obsol	849,696	943,186	977,008	947,616
Research exp	371,567	383,412	463,956	453,148
Oper profit	$2,699,335	$1,258,037	$1,534,745	$792,412
Other income	235,593	199,629	189,045	199,875
Total income	$2,934,928	$1,457,666	$1,723,790	$992,287
Interest	81,641	102,059	108,529	112,829
Other charges	210,221	111,362	162,550	41,698
Fed tax prov	421,859	231,547	171,929	105,076
Net profit	$2,221,207	$1,012,698	$1,280,782	$732,684
Dividends	867,811	533,008	535,273	515,561
Surplus	$1,353,396	$479,690	$745,509	$217,123

Freeport Texas Nets $2,478,839

Freeport Texas and wholly-owned subsidiaries, for year ended Dec. 31, '33, certified by independent auditors, shows net income of $2,478,839 after depreciation, federal taxes, provisions for prospecting and contingencies, equivalent after deducting $116,506 dividends paid on 6% preferred stock, to $3.14 a share (par $10) on average number of common shares outstanding during the year. Based on 784,663 common shares outstanding at close of year, net income is equal after preferred dividends, to $3.01 a share. This compares with net income in '32, of $2,005,098 or $2.75 a share on 729,844 shares of capital stock then outstanding.

The above statement does not include $168,402 of the net loss of Cuban-American Manganese Corp. and wholly-owned subsidiaries for year '33, which is the proportionate amount applicable to the interest of Freeport Texas Co. in the preferred and common stocks of that company. For the last quarter of '33, it is stated, earnings amounted to 96c a share, after preferred dividends, on the total amount of common stock outstanding at the end of the year as compared with 68c a share on 729,844 shares for the last quarter of '32.

Current assets as of Dec. 31, '33 amounted to $9,435,407 and current liabilities were $3,396,659 comparing with $8,626,173 and $2,392,335, respectively, at end of preceding year. At close of '33, cash was $2,648,377 against $2,244,362 on Dec. 31, '32.

American Commercial Alcohol Earnings Higher

American Commercial Alcohol Corp. and subsidiaries for year ended Dec. 31, '33, (preliminary) shows net income of $1,190,346 after charges, taxes, depreciation, etc., equivalent to $4.56 a share (par $20) on 260,890 shares of capital stock. This compares with $586,438 or $3.01 a share on 194,747 shares in 1932.

Net income for quarter ended Dec. 31, '33, was $971,882 after taxes, charges and depreciation, equal to $3.72 a share on 260,890 shares, comparing with $85,404 or 32c a share on 260,859 shares in preceding quarter and $181,616 or 93c a share on 194,747 shares in December quarter of '32. Statement for quarter ended Dec. 31, '33, compares as follows:

	1933	1932
Operating income	$1,043,867	$219,334
Depreciation	72,035	37,718
Net income	$971,832	$181,616

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The Industry's Securities

1934 February Last	1934 February High	1934 February Low	1933 High	1933 Low	1932 High	1932 Low	Sales In February	Sales During 1934	Stocks	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1933	Earnings $-per share-$ 1932
Feb. 28							Number of Shares							
NEW YORK STOCK EXCHANGE														
98⅛	106½	95⅛	112	47½	63½	30⅞	14,300	41,100	Air Reduction	No	841,288	$3.00*	3.79	2.73
152	160⅛	144	152	70¾	88½	42⅝	45,900	78,700	Allied Chem. & Dye	No	2,401,288	6.00		3.62
125	126	122½	125	115	120†	96½	1,200	2,400	7% cum. pfd.	100	392,849	7.00		
28½	36	25½	35	7¼	15½	3½	30,100	70,500	Amer. Agric. Chem.	100	315,701	None		—p3.86
49⅜	62½	47¾	89⅞	13	27	11	94,200	290,200	Amer. Com. Alcohol	20	260,716	None	4.56	3.01
28	31⅞	26½	29¼	9¾	15½	7	12,200	17,700	Archer-Dan.-Midland	No	541,546	1.00	1.82	q1.44
46¼	46½	35½	39½	9	25½	7*	12,100	27,900	Atlas Powder Co	No	234,235	2.00	.74	—2.14
98	98	83	83½	60	79½	45½	970	1,400	6% cum. pfd.	100	88,781	6.00		
39⅛	44½	33⅞	58⅛	4½	12⅞	1½	200,100	442,400	Celanese Corp. Amer.	No	987,800	None	3.32	— .95
15½	17⅞	9⅛	22⅛	7	31½	10½	169,800	259,000	Colgate Palm-Peet	No	1,985,812	None	— .57	— .74
82⅞	86	68½	88	49	95	65	1,300	1,400	6% pfd.	100	254,500	6.00		
66	71	58	71½	23½	41¼	13½	50,100	73,800	Columbian Carbon	No	538,154	2.00		1.83
27⅛	36⅞	36½	57¼	9	13¾	3½	545,700	1,357,000	Commer. Solvents	No.	2,635,371	.60	.88	.51
71⅛	84½	71¼	90⅛	45⅜	55⅝	24¼	45,000	84,200	Corn Products	25	2,530,000	3.00		2.77
141	141	135	145¼	117½	140	99½	960	1,320	7% cum. pfd.	100	243,739	7.00		
44⅜	49⅛	29	33⅞	10	16⅛	7	19,500	33,700	Devoe & Rayn. A.	No	95,000	h1.00		—r1.00
98⅛	103⅜	90⅛	95⅞	32½	59¼	22	200,500	520,400	DuPont de Nemours	20	10,871,997	i2.00	2.93	1.81
119¼	119¼	115	117	97½	105½	80¾	5,400	9,900	6% cum. deb.	100	1,092,699	6.00	35.58	24.00
90½	93⅛	79	89¾	46	87⅛	35½	32,700	57,600	Eastman Kodak	No	2,250,921	3.00		2.52
132	132	120	130	110	125	99	190	650	6% cum. pfd.	100	61,657	6.00		
46½	50⅜	43⅜	49⅜	16⅛	28⅜	10	53,500	78,300	Freeport Texas	10	784,664	2.00	3.01	2.75
160	160⅜	150½	160½	97	...	...	600	1,500	6% conv. pfd.	100	25,000	6.00		
22¼	24	15⅜	20	3¼	10⅜	3½	121,100	207,300	Glidden Co.	No	603,304	1.00	1.54	—s.06
98	99	83	91½	48	76	35	2,700	3,315	Glidden, pr. pfd.	100	63,044	7.00	22.60	7.85
89½	96⅜	87¼	85⅞	65	...	...	5,600	10,600	Hazel Atlas	25	411,065	5.00		5.58
65⅛	71	59	68⅜	15	29½	13⅞	16,500	23,200	Hercules Powder	No	582,679	2.00	2.79	.24
119½	120	111	110½	85	95	70½	320	530	7% cum. pfd.	100	105,765	7.00	22.38	8.39
83	96⅜	74⅜	85	24	40	7½	29,800	76,600	Industrial Rayon	No	200,000	4.00	9.03	1.64
4¼	6½	2	5⅞	⅛	3½	¼	119,100	152,900	Intern. Agricul.	No	436,049	None	—4.04	—q4.47
30½	33	15	23½	5	15	3½	8,200	17,700	7% cum. pr. pfd.	100	100,000	None		
23⅜	24½	21	23¼	6¼	12½	3½	409,200	804,900	Intern. Nickel	No	14,584,025	None		— .14
23	25½	21	27¼	13¼	23½	9¼	4,200	10,200	Intern. Salt	No	240,000	1.50	2.04	2.14
22½	24½	15⅜	22	7½	11	8	15,700	19,600	Kellogg (Spencer)	No	500,000	1.00	.98	—v.26
37¼	43⅞	34½	37⅜	4¼	9⅜	3¾	171,300	430,300	Libby Owens Ford	No	2,559,042	1.20	1.64	— .13
27⅛	32½	27	50	10½	22	9	33,000	62,800	Liquid Carbonic	No	342,406	1.00		—u1.29
35½	40⅜	32½	46⅜	14	20⅞	9	70,300	251,900	Mathieson Alkali	No	t650,436	1.50	1.70	.86
77⅜	86⅞	80	83	25	30½	13⅜	6,300	16,300	Monsanto Chem.	10	427,116	k1.25	5.14	2.37
139⅜	141½	136	140	43¼	92	45	1,000	3,500	National Lead	100	309,831	5.00		3.15
139	140	122	128¼	101	125	87	700	1,500	7% cum. "A" pfd.	100	243,676	7.00		
102	103	100½	109¼	75	105	61	500	800	6% cum. "B" pfd.	100	103,277	6.00		
9⅜	10⅜	6	11⅜	1⅜	3⅜	1½	29,000	39,500	Newport Industries	1	519,347	None		— .77
87¼	94	78¼	96⅜	31⅜	42¼	12	29,500	55,400	Owens-Illinois Glass	25	1,200,000	3.00	4.86	1.62
39	41¼	36	47⅛	19⅜	42¼	19⅞	35,500	88,600	Procter & Gamble	No	6,410,000	1.50	1.52	q1.26
105	106	102½	110⅜	97	103½	81	710	1,855	5% pfd. (ser. 2-1-29)	100	171,569	5.00		
5⅜	6⅞	4⅛	7¼	1⅜	4⅜	1	25,800	38,400	Tenn. Corp.	5	857,896	None		— .89
38⅛	43½	37⅞	45⅛	15½	26½	12	142,000	239,900	Texas Gulf Sulphur	No	2,540,000	2.00		2.33
44⅜	50⅞	45	51⅛	19⅜	36⅜	15½	190,200	360,100	Union Carbide & Carbon	No	9,000,743	1.00		.98
38	40⅜	35	37½	10½	18	6⅜	25,100	57,100	United Carbon	No	370,127	1.60	1.39	— .05
53	64⅜	53½	94	13½	36½	13½	60,000	165,500	U. S. Indus. Alco.	No	381,813	None		—3.54
27½	31½	21	36½	7⅜	23⅜	5½	115,000	188,000	Vanadium Corp.-Amer.	No	366,637	None		—4.36
4⅜	5⅜	3⅛	7⅜	⅛	2⅛	⅛	40,200	65,000	Virginia-Caro. Chem.	No	486,000	None	—4.93	—q5.73
22	24½	14½	26⅜	3⅜	11¼	3½	14,200	25,200	6% cum. pact. pfd.	100	213,392	None		
75	75	59½	63⅛	35⅜	69½	20	200	1,200	7% cum. prior pfd.	100	60,000	None		
22½	27½	14¼	20⅜	5	12⅜	3	64,300	76,400	Westvaco Chlorine	No	284,962	.40	1.08	.79
NEW YORK CURB EXCHANGE														
17¾	20⅜	15⅛	16⅛	3¼	8½	1⅜	128,300	259,000	Amer. Cyanamid "B"	No	2,404,194	m1.00		.14
3½	3⅞	3⅛	4⅛	1	2⅛	¼	11,900	15,600	British Celanese Am. R.C.R.	243		None		
99	103¼	93⅛	110	27	55	8	1,950	3,225	Celanese, 7% cum. 1st pfd	100	144,379	7.00	32.24	.60
92	92	83	90	51	64½	17	1,775	2,250	7% cum. prior pfd.	100	113,668	7.00	47.98	7.77
14	19	12⅛	26⅞	2	5⅜	1⅛	700	3,525	Celluloid Corp.	15	194,952	None	—1.00	—3.79
12⅜	12⅜	10⅛	11⅛	4⅛	6⅞	4½	2,500	9,400	Courtaulds' Ltd.	1£	24,000,000	4¼%		w.26
71⅛	77⅛	70	78	30	39	21½	3,800	6,000	Dow Chemical	No	630,000	2.00	1.99	2.95
5½	6¾	4	8	⅛	1½	¼	7,400	12,200	Duval Texas Sulphur	No	500,000	None		x.30
22	23	19	19	8	...	...	1,200	1,900	Heyden Chem. Corp.	10	147,600	1.00		1.23
49	49½	39	39⅞	13	19½	12⅛	19,400	45,325	Pittsburgh Plate Glass	25	2,141,305	1.00		— .03
62½	65	47¼	47	12⅞	35	17½	20,125	44,950	Sherwin Williams	25	635,583	2.00	y3.54	— .44
105	105	100	99	80	100½	75	310	440	6% pfd. AA. cum.	100	155,521	6.00	y20.78	4.52
CLEVELAND STOCK EXCHANGE														
71⅛	76⅛	72⅛	78	30	40	21⅛	1,200	2,775	Dow Chemical	No	630,000	2.00	1.99	f2.95
PHILADELPHIA STOCK EXCHANGE														
...	...	56	38*	25¼	40	19⅞		575	Pennsylvania Salt	50	150,000	3.00	2.17	2.42

1934 February Last	1934 February High	1934 February Low	1933 High	1933 Low	1932 High	1932 Low	Sales In February	Sales During 1934	Bonds	Date Due	Int. %	Int. Period	Out-standing $
Feb. 28													
NEW YORK STOCK EXCHANGE													
100⅛	100⅛	93⅛	95	70⅛	80	62	252,000	438,000	Amer. Cyan. deb. 5's	1942	5	A. O.	4,411,000
94⅜	96⅛	83⅞	89	64	80	54½	658,000	1,030,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N.	29,929,000
11	13	5	14⅛	2⅛	18	1	634,000	1,184,000	Anglo Chilean s. f. deb. 7's	1945	7	M. N.	12,700,000
80	80⅛	61⅛	74⅞	37	60	34½	139,000	174,000	By-Products Coke Corp. 1st. 5½'s "A"	1945	5½	M. N.	4,932,000
100⅛	101⅞	100⅛	104⅛	100⅛	104⅞	100⅜	2,000	33,000	Corn Prod. Refin. 1st. s. f. 5's	1934	5	M. N.	1,766,000
72	77	62	65	38½	54⅛	32	18,000	37,000	Int. Agric. Corp. 1st. Coll. tr. stamped to 1942	1942	5½	M. N.	5,994,100
14	16	5⅛	14⅞	2½	15½	¼	1,588,000	3,227,000	Lautaro Nitrate conv. b's	1954	6	J. J.	31,357,000
96½	98⅛	96	99⅛	87	97½	67	184,000	217,000	Montecatini Min. & Agric. det. 7's with warrants	1937	7	J. J.	7,075,045
70½	71½	52⅛	62	33⅜	59	17	68,000	189,000	Ruhr Chem. 6's	1948	6	A. O.	3,156,000
100	100	98	99½	87	90	66	63,000	162,000	Solvay Am. Invest. 5% notes	1942	5	M. S.	10,062,000
79	80	65½	76	50	66	39	33,000	49,000	Tenn. Corp. deb. 6's "B"	1944	6	M. S.	3,007,900
80⅓	85	62	81	34¾	75	30	474,000	595,000	Vanadium Corp. conv. 5's	1941	5	A. O.	4,261,000
NEW YORK CURB EXCHANGE													
102	102	101⅛	103¼	101	103½	99	25,000	29,000	Westvaco Chlorine Prod. 5½'s	1937	5½	M. S.	1,393,000

*Plus 75c extra; fYears ended 5-31-32-& 33; hPlus 25c ended 5-31-32-& 33; iPlus 75c ended 5-31-32-& 33; jPlus 75c ended 5-31-32-& 33; kPlus 75c ended 5-31-32-& 33; mIf rate of last quarter be cont.; pYear ended 6-30-32; qYears ended 6-30-32 & 6-30-33; rYear ended 11-30-32; sYears ended 10-31-32 & 33; tBefore issue, rights; uYear ended 9-30-32; vYears ended 9-2-32 & 33; w@ $4,866 to the £; xYears ended 5-31-32 & 33; yYear ended 8-31-33; zYear ended 8-13-32.

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The Trend of Prices

Business Goes Forward

With but a slight pause to recover from the effects of the successor to the Blizzard of '88 business marched forward with a snap in the past month, the accelerated pace indicating still further net gains in practically all lines. Certain it is that business and industry in general have moved into much higher levels of activity despite considerable pessimism over the ultimate efficacy of a number of the divisions of the so-called recovery plans of the administration.

Retail sales were reported 25 to 30% ahead of February a year ago. Sales were limited almost entirely to winter goods with little immediate interest in spring and summer materials. Wholesale trade reflected the improved state of the retailer and was estimated 30 to 40% better than a year ago.

Most encouraging was the decided gain in the heavy industries. Steel operations rose to 45.7% of capacity, the best showing since last August. Both carloadings and electrical output figures moved up. Output of autos reached the highest total since 1930. Employment in the automotive field is 40% higher than a year ago with company earnings estimated at '28-'29 levels. Employment generally rose in February. In some lines, notably the radio, employment gains were quite impressive. Shoe and textile industries expanded operations in February. Glass industry continued to operate at a very satisfactory rate. Rayon producers were reported well sold ahead.

Commodity markets turned reactionary near the close of the month after reaching, in many cases, levels approximately equaling the high figures of last June-August period. Cotton declined sharply owing to liquidation caused by the delay in reporting the Bankhead bill out of committee. Wheat prices were soggy also and reached the lowest point in 2 months. Despite the reaction in commodity prices in the last week of the month most of the accepted indices indicated, however, a net gain for the 4 weeks. The stock market was reactionary also, although earlier in the month a number of important key stocks reached new highs for the current year.

Consumption and production of chemicals and allied products were in better volume in February than in the preceding month. Inventory stocks, built up in anticipation of higher '34 contract prices, were materially cut into and an improvement in shipments was quite apparent. In addition most of the heavy consuming industries expanded rates of operation. Consumption of cotton is said to be close to '29-'30 level. After a lull in the textile processing and dyeing centers in the first half of the month, activity definitely expanded. Paint and lacquer producers are expanding production rapidly, anticipating the best spring business in several years. With automotive schedules stepped up encouragingly lacquer consumption is expected to show wide gains in the next 3 months. Automotive production is thought to have reached the 225,000 mark in February, the largest month since '30, and in March production is expected to reach 300,000. For the same reason the Akron tire section is extremely busy. Alkali shipments into the glass field are reported as still heavy. Fertilizer tag sales point to the best season in years. Sulfuric acid consumption has improved with much larger tonnages moving into the fertilizer and steel industries. In practically all lines it is confidently expected that March chemical tonnage will be extremely heavy (March and October under normal conditions are the months of heaviest consumption).

Month's Business Statistics

	January 1934	*January 1933*	*December 1933*	*December 1932*	*November 1933*	*November 1932*
Auto production *a*	161,006	130,087	84,045	107,353	63,904	59,557
Bldg. contracts *††	$187,463	.....	$207,209	$81,219	$162,330	$105,302
Coal, soft, output, tons	32,935,000	27,060,000	29,600,000	31,522,000	30,582,000	30,632,000
Cotton consumption, bales	508,034	470,182	348,393	.....	475,000	503,722
Factory employment‡	70.5	58.1	70.1	58.3	72.4	61.2
Payroll totals‡	52.9	39.2	49.8	37.7	53.6	41.8
Failures Dun & Brad	1,364	1,132	1,132	2,469	1,237	2,440
Merch imports†	$129,000	$95,993	$133,000	$97,087	$128,000	$104,468
Merch exports†	$169,531	$118,559	$192,000	$131,614	$184,000	$138,534
Newsprint Product:						
Canada, tons	188,374	140,539	175,304	138,682	193,718	161,334
U. S., tons	84,194	74,444	80,895	80,075	87,567	81,662
Newfoundland, tons	25,477	33,207	26,030	21,704	26,538	21,195
Total	297,278	238,598	283,833	241,365	309,244	265,035
Newsprint Ship:						
Canada, tons	187,352	133,056	172,285	140,770	201,102	164,327
U. S., tons	84,796	72,725	82,031	79,002	86,829	83,922
Total (Can. & U. S.)	272,148	205,781	254,316	219,772	287,391	48,249
Newsprint Stocks:						
(Can.) tons	34,711	41,337	33,847	54,214	30,858	48,461
U. S. tons	17,184	21,783	18,566	32,709	19,697	32,790
Total (Can. & U. S.)	52,495	64,137	52,413	86,923	50,534	81,201
Plate glass output, sq. ft. *b*	7,607,195	6,188,263	6,346,645	4,267,809	4,169,442	4,510,960
Shoe production, pairs *j*	.....	.....	20,094,994	.....	23,694,800	25,148,928
Still ingots	1,996,897	1,030,075	1,819,648	861,034	1,540,882	1,032,221
Tire shipments	.....	.....	3,531,121	1,818,700	2,197,485	1,711,298
" production	.....	.....	3,081,886	1,982,681	3,039,386	2,303,545
" inventory	.....	.....	8,888,070	7,644,359	9,246,563	7,454,44g
Chemical						
Elect-energy consumption°	.....	.....	.....	.....	163.0	130.1
Stocks, mfg. goods°	.....	.....	.....	.....	116	121
Stocks, raw materials°	.....	.....	.....	.....	121	122
Chemical Prices						
Dept. of Labor:						
Chem. price index‡	78.8	79.3	79.2	79.7	79.2	79.7
Fert. price index‡	68.4	62.3	68.1	63.1	67.8	63.5
Mixed Fert. price index‡	71.2	62.7	69.9	65.6	68.5	65.6
Chemical Employment						
Dept. of Labor:						
Chem. emp‡	122.9	85.4	121.3	84.6	121.9	85.3
Fert. emp.‡	84.5	49.9	75.1	43.5	72.0	46.0
Paints & varnish emp‡	80.2	63.6	77.0	65.7	77.8	67.1
Petroleum ref. emp.‡	73.6	62.1	74.2	62.5	72.4	61.5
Rayon emp.‡	190.3	149.3	191.8	146.9	197.7	142.8
Soap emp.‡	105.2	94.2	106.9	94.5	112.1	98.3
Chemical Payrolls						
Dept. of Labor:						
Chemical‡	88.2	60.4	87.9	59.8	86.3	61.6
Fertilizer‡	54.0	32.5	48.1	30.4	44.2	30.8
Paint & varnish‡	61.8	45.9	59.4	49.3	58.9	51.7
Petroleum refinery‡	59.9	53.3	59.8	51.8	60.1	52.0
Rayon‡	164.4	123.5	174.5	122.5	172.9	120.2
Soap‡	87.4	77.0	88.2	79.2	91.6	83.0

*37 states, F. W. Dodge Corp.; †000 omitted; °Monthly average, 1923-25=100, Dept. of Commerce; ‡Dept. of Labor, 1926=100; *j*1933 shoe production 350,381,737 pairs, 11.8% above '32; *a*—total sale of motor vehicles in '33—1,739,633 units a gain of 36.25% over 1,276,812 for '32. Total production in U. S. in '33 totalled 1,959,201 as against 1,370,678 in '32; *b*—Total '33 production 86,037,805 sq. ft., compares with 52,221,635 sq. ft. produced in '32.

Weekly Business Statistics

	Carloadings			*Electrical Output*			*Jour. of Com. Price*	*National Fertilizer Association Indices*					*Labor Dept. Chem. & Drug*		*Fisher's Index*
Week Ending	*1934*	*1933*	*% Inc.*	*1934*	*1933‡*	*% Inc.*	*Index*	*Metals*	*Fats & Oils*	*Chem. & Drugs*	*Mixed Fert.*	*Fert. Mat.*	*All Groups*	*Price Index*	*% Steel Activity*	*Purch. Power*
Feb. 3	564,098	486,059	16.0	1,636,275	1,454,913	12.5	73.1	78.7	50.4	93.0	67.4	74.5	70.2	75.0	37.5	137.4
Feb. 10	572,504	504,663	13.4	1,651,535	1,482,509	11.4	74.3	78.5	53.4	93.0	67.4	74.5	70.7	75.1	39.9	136.6
Feb. 17	598,896	517,529	15.7	1,640,951	1,469,732	11.6	75.1	78.3	54.9	93.1	67.5	75.8	71.5	75.4	43.6	135.7
Feb. 24	573,371	462,315	24.0	1,646,465	1,425,511	15.5	74.3	78.5	54.4	93.1	67.5	75.8	71.2	75.4	45.7	134.8
March 3	604,137	481,208	25.5	1,658,040	1,422,875	16.5	74.9†	78.6	55.2	93.1	67.6	75.8	....	75.4	48.0*	134.5

*Highest rate since last August which had an average rate of 49.42%; †Low point was 52.5 reached Feb. 4, 1933; ‡Total production of electricity for public use in U. S. in '33 equaled 85,164,000,000 kwh., an increase of 2½% over 83,153,000,000 in '32.

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Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1933 Average $1.56 - Jan. 1933 $1.76 - Feb. 1934 $1.36

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Acetaldehyde, drs 1c-1 wks...lb.	....	.16	.16	.21	.18½ .21
drums, c-l, wks.....lb.	....	.14	.14	.16½	... ...
Acetaldol, 50 gal dr.....lb.	.27	.31	.27	.31	.27 .31
Acetamide.....lb.	.40	.75	.40	1.35	.95 1.35
Acetanilid, tech, 150 lb bbl...lb.	....	.26	....	.26	... .26
Acetic Anhydride, 92-95%, 100 lb cbys.....lb.	.21	.25	.21	.25	.21 .25
Acetin, tech drums.....lb.	.30	.32	.30	.32	.30 .32
Acetone, tanks.....lb.	....	.10	....	.10	.08 .10
Acetone Oil, bbls NY.....gal..	1.15	.25	1.15	.25	1.15 1.25
Acetyl Chloride, 100 lb cby...lb.	.55	.68	.55	.68	.55 .68
Acetylene Tetrachloride (see tetrachlorethane).....					
Acids					
Acid Abietic.....	....	.07	.06	.07	.06 .12
Acetic, 28% 400 lb bbls c-l wks .....100 lb.	....	2.91	....	2.91	2.65 2.91
Glacial, bbl c-l wk....100 lb.	....	10.02	....	10.02	9.14 10.02
Adipic.....	.72	.72	.72	.72	.72 .72
Anthranilic, refd, bbls.....lb.	.85	.95	.85	.95	.85 .95
Technical, bbls.....lb.	.65	.70	.65	.70	.65 .70
Battery, cbys.....100 lb.	1.60	2.25	1.60	2.25	1.60 2.25
Benzoic, tech, 100 lb bbls....lb.	.40	.45	.40	.45	.35 .45
Boric, powd, 250 lb. bbls. .....lb.	.0425	.05	.0425	.05	.0425 .05
Broenner's, bbls.....lb.	1.20	1.25	1.20	1.25	1.20 1.25
Butyric, 100% basis cbys....lb.	.80	.85	.80	.85	.80 .85
Camphoric.....lb.	....	5.25	....	5.25	... 5.25
Chlorosulfonic, 1500 lb drums wks.....lb.	.04½	.05½	.04½	.05½	.04½ .05½
Chromic, 99½%, drs.....lb.	....	.13½	....	.13½	.11½ .14¼
Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.00	1.06	1.00 1.06
Citric, USP, crystals, 230 lb. bbls.....lb.	.28	.29	.28	.30	.29 .30
Cleve's, 250 lb bbls.....lb.	.52	.54	.52	.54	.52 .54
Cresylic, 95%, dark drs NY.gal.	....	.50	....	.50	.38 .50
97-99%, pale drs NY.....gal.	....	.55	....	.55	.40 .55
Formic, tech 90%, 140 lb. cby.....lb.	.11	.13	.11	.13	.10½ .13
Furoic, tech., 100 lb. drums.lb.	....	.35	....	.35	... .35
Gallic, tech, bbls.....lb.	.60	.70	.60	.70	.60 .70
USP, bbls.....lb.	....	.77	.74	.77	... .74
Gamma, 225 lb bbls wks.....lb.	.77	.79	.77	.79	.75 .79
H, 225 lb bbls wks.....lb.	.65	.70	.65	.70	.60 .70
Hydriodic, USP, 10% soln cby lb.	.50	.51	.50	.51	.50 .51
Hydrobromic, 48%, coml, 155 lb cbys wks.....lb.	.45	.48	.45	.48	.45 .48
Hydrochloric, CP, see Acid Muriatic.....					
Hydrocyanic, cylinders wks .lb.	.80	.90	.80	.90	.80 .90
Hydrofluoric, 30%, 400 lb bbls wks.....lb.	....	.07	....	.07	.06 .07
Hydrofluosilicic, 35%, 400 lb. bbls wks.....lb.	.11	.12	.11	.12	.11 .12
Hypophosphorous, 30%, USP, demijohns .....lb.	.75	.80	.75	.80	.75 .80
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½	.04	.04½	.04 .04½
44%, light, 500 lb bbls.....lb.	.11½	.12	.11½	.12	.11½ .12
Laurent's, 250 lb bbls.... ...lb.	.36	.37	.36	.37	.36 .37
Linoleic.....lb.	.16	.16	.16	.16	.16 .16
Maleic, cry. kegs.....lb.	....	.35	....	.35	... ...
Malic, powd, kegs.....lb.	.45	.60	.45	.60	.45 .60
Metanilic, 250 lb bbls.....lb	.60	.65	.60	.65	.60 .65
Mixed Sulfuric - Nitric..... tanks wks.....N unit	.06½	.07½	.06½	.07½	.06½ .07½
tanks wks.....S unit	.008	.01	.008	.01	.008 .01
Monochloroacetic, tech bbl...lb.	.16	.18	.16	.18	.16 .18
Monosulfonic, bbls.....lb.	1.50	1.60	1.50	1.60	1.50 1.60
Muriatic, 18 deg, 120 lb cbys c-1 wks.....100 lb.	....	1.35	....	1.35	... 1.35
tanks, wks.....100 lb.	....	1.00	....	1.00	... 1.00
20 degrees, cbys wks...100 lb.	....	1.45	....	1.45	... 1.45
N & W.....250 lb bbls	.85	.95	.85	.95	.85 .95
Naphthenic, drums .....lb.	.10	.11½	.10	.11½	.10 .11½
Naphthionic, tech.....250 lb.	.60	.65	.60	.65	.60 .65
Nitric, 36 deg, 135 lb cbys c-wks. .....100 lb.	....	5.00	....	5.00	... 5.00
40 deg, 135 lb cbys, c-1 wks.....100 lb.	....	6.00	....	6.00	... 6.00
Oxalic, 300 lb bbls wks NY....lb.	.11⅞	.12⅜	.11⅞	.12⅜	.11 .12⅜
Phosphoric 50%, U. S. P.....lb.	....	.14	....	.14	... .14
Syrupy, USP, 70 lb drs....lb.	....	.14	....	.14	... .14
Picramic, 300 lb bbls.....lb.	.65	.70	.65	.70	.65 .70
Picric, kegs.....lb.	.30	.50	.30	.50	.30 .50
Pyrogallic, crystals..... .....lb.	1.40	1.45	1.40	1.45	1.40 1.45
Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.33	.37	.33 .37
Sebacic, tech, drum.....lb.	.58	.58	.58	.58	.58 .58
Sulfanilic, 250 lb. bbls.....lb.	.18	.19	.18	.19	.15 .17
Sulfuric, 66 deg, 180 lb cbys					

†Anhydrous 5c higher. *Delivered metropolitan area, basic price 34c. §Higher price is refrigeration grade. a–New revenue tax adds $0.90 to the cost of tax paid ethyl alcohol. Quotation above includes this tax.

	Current Market	1934 Low	1934 High	1933 Low	1933 High
1c-1 wks.....100 lb.	1.60	1.95	1.60	1.95	1.60 1.95
tanks, wks, ton	....	15.00	....	15.00	.... 15.00
1500 lb dr wks.....100 lb.	1.50	1.65	1.50	1.65	1.50 1.65
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.27½	1.42½	1.27½ 1.42½
Oleum, 20%, 1500 lb. drs 1c-1 wks.....ton	....	18.50	....	18.50	.... 18.50
40%, 1c-1 wks net.....ton	....	42.00	....	42.00	.... 42.00
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23 .40
Tartaric, USP, gran. powd, 300 lb bbls.....lb.	....	.25	....	.25	.20 .25
Tobias, 250 lb bbls.....lb.	.75	.80	.75	.80	.75 .80
Trichloroacetic bottles.....lb.	2.00	2.75	2.00	2.75	2.00 2.75
Kegs.....lb.	....	1.75	....	1.75	.... 1.75
Tungstic, bbls.....lb.	1.40	1.70	1.40	1.70	1.40 1 70
Albumen, blood, 225 lb bbls...lb.	.35	.43	.35	.43	.35 .43
dark.....bbls., lb.	.10	.17	.10	.17	.10 .17
Egg, edible .....lb.	.85	.90	.85	.90	.74 .90
Technical, 200 lb cases...lb.	.62	.66	.62	.66	.62 .66
Vegetable, edible.....lb.	.65	.70	.65	.70	.60 .70
Technical.....lb.	.50	.55	.50	.55	.50 .55
Alcohol Butyl, Normal, 50 gal drs c-1 wks.....lb.	....	.10½	....	.10½	.... .10½
Drums, 1-c-1 wks.....lb	....	.11	....	.11	.... .11
Tank cars wks.....lb.	....	.09½	....	.09½	.... .09½
Secondary tank .....lb.	....	.076	....	.076	....
drums carlots .....lb.	....	.086	....	.086	....
Amyl (from pentane) Tanks wks .....lb.	....	.143	....	.143	.143 .176
Capryl, tech, drums.....lb.	....	.85	....	.85	.... .85
Diacetone, tanks.....lb.	.15¾	.16¾	.15¾	.16¾	.15¾ .16¾
Ethyl, USP, 190 pf, 50 gal. bbls.....gal.	4.12½	4.24½a	4.12½	4.24½	2.44½ 2.65
No. 5. *188 pf, 50 gal. drs. drums extra†.....gal.	....	.351*	....	.351*	.... *.385
No. S. D. 1, tanks .....gal.	....	.304	....	.304	.... .304
Furfuryl, tech., 500 lb. drs.lb.	....	.40	....	.40	.40 .45
Isobutyl, ref., gal. drs.....gal.	....	.75	....	.75	.... .75
Isopropyl, ref, gal drs.....gal.	....	.50	....	.50	.45 .50
Propyl Normal, 50 gal dr..gal.	....	.75	....	.75	.... .75
Aldehyde Ammonia, 100 gal drlb.	.80	.82	.80	.82	.80 .82
Aldol. 95%, l-cl dr.....lb.	....	.25	....	.25	....
c-l, dr.....lb.	....	.21	....	.21	....
Alpha-Naphthol, crude, 300 lb. bbls.....lb.	.65	.70	.65	.70	.65 .70
Alpha-Naphthylamine, 350 lb. bbls.....lb.	.32	.34	.32	.34	.32 .34
Alum Ammonia, lump, 400 lb bbls, 1-c-1 wks.....100 lb.	3.00	3.25	3.00	3.25	3.00 3.25
Chrome, 500 lb casks, wks .....100 lb.	7.00	7.25	6.50	7.25	4.50 6.50
Potash, lump, 400 lb casks wks.....100 lb.	3.00	3.50	3.00	3.50	3.00 3.50
Soda, ground, 400 lb bbls wks.....100 lb.	3.50	3.75	3.50	3.75	3.50 3.75
Aluminum Metal, c-1 NY.100 lb.	22.90	24.30	22.90	24.30	22.00 24.30
Chloride Anhyd., 99%, wks.lb.	.07	.12	.07	.12	....
93% grade, wks.....lb.	.04	.08	.04	.08	....
Hydrate, 96%, light, 90 lb. bbls.....lb.	.15	.16½	.15	.16½	.15 .16½
Palmitate, bbls.,.....lb	.19	.20	.19	.20	....
Resinate, pp., bbls.....lb.	.12½	.14	.12½	.14	....
Stearate, 100 lb bbls.....lb.	.17	.18	.17	.18	.12½ .18
Sulfate, Iron, free, bags c-1 wks.....100 lb.	1.90	1.95	1.90	1.95	1.90 1.95
Coml, bags c-1 wks .100 lb.	1.35	1.50	1.35	1.50	1.25 1.50
Aminoazobenzene, 110 lb kegs lb.	....	1.15	....	1.15	.... 1.15
Ammonia					
Ammonia anhydrous Com. tanks	.04½	.05½§	.04½	.05½§	.04½ .05½
Ammonia, anhyd. 100 lb cyl...lb.	.15½	.15½	.15½	.15½	.15½ .15½
Water, 26°, 800 lb dr del...lb.	.02½	.03	.02½	.03	.02½ .03
Ammonia, aqua 26° tanks.... NH cont.....	....	.05	....	.05	..... .05
Ammonium Acetate .....lb.	.26	.33	.26	.33	.26 .33
Bicarbonate, bbls., f.o.b. plant .....100 lb.	....	5.15	....	5.15	.... 5.15
Bifluoride, 300 lb bbls.....lb.	.15¼	.17	.15¼	.17	.15½ .17
Carbonate, tech, 500 lb ca. .lb.	.08	.12	.08	.12	.08 .12
Chloride, white, 100 lb. bbls wks .....100 lb.	5.00	5.25	5.00	5.25	4.45 5.25
Gray, 250 lb bbls wks...lb.	5.25	5.75	5.25	5.75	5.25 5.75
Lump, 500 lb cks spot...lb.	.10	.11	.10	.11	.10 .11
Lactate, 500 lb bbls.....lb.	.15	.16	.15	.16	.15 .16
Linoleate.....lb.	....	.12	.11	.12	.... .11
Nitrate, tech, casks.....lb.	.03¾	.05	.03¾	.05	.03¾ .10
Oleate, drs.....lb.	....	.10	....	.10	.... .10
Persulfate, 112 lb kegs.....lb.	.20	.22½	.20	.22½	.20 .22½
Phosphate, tech, powd, 325 lb. bbls.....lb.	.08	.10	.08	.11½	.08½ .11½
Sulfate, bulk c-1.....100 lb.	....	1.25	....	1.25	1.00 1.25
Sulfocyanide, kegs.....lb.	....	.50	....	.50	.36 .50
Amyl Acetate, (from pentane) Tanks del.....lb.	....	.13½	....	.13½	... 13½
Tech., drs del.....lb.	.142	.149	.142	.149	.138 .149

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Distillery

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Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Secondary, tanks lb.	....	.09	....	.09	....	.09
Amyl Alcohol, see also Fusel Oil.						
Amyl Alcohol, sec. lb.	....	.08½	.08½	.08½	....	....
Aniline Oil, 960 lb drs & tks. lb.	.15	.17½	.15	.17½	.14½	.16
Annatto, fine lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% lb.	....	.75	....	.75	....	....
40% lb.	....	.18	....	.18	....	....
Anthraquinone, sublimed, 125 lb. bbls lb.	....	.45	....	.45	...	.45
Antimony, metal slabs, ton lots lb.	.07½	.07½	.07	.07½	.05½	.07½
Needle, powd, bbls lb.	.08	.09	.08	.09	.07	.09
Chloride, soln (butter of) cbys lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls lb.	.08	.11	.08	.11	.07½	.11
Salt, 63% to 65%, tins lb.	.22	.24	.22	.24	.20	.24
Sulfuret, golden, bbls lb.	.16	.20	.16	.20	.16	.20
Vermillion, bbls lb.	.38	.42	.38	.42	.38	.42
Archil, conc, 600 lb bbls lb.	.21	.27	.21	.27	.20	.21
Double, 600 lb bbls lb.	.18	.20	.18	.20	.16	.17
Triple, 600 lb bbls lb.	.18	.20	.18	.20	.16	.17
Argols, 80%, casks lb.	.15	.16	.15	.16	.12	.15
Crude, 30%, casks lb.	.08	.09	.08	.09	.06¼	.09
Aroclors, wks lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl lb.	.08½	.09½	.08½	.09½	....	....
Arsenic, Red. 224 lb kegs, cs. lb.	.14½	.15½	.14	.15½	.09½	.14½
White, 112 lb kegs lb.	.04	.05	.04	.05	.04	.05
Metal lb.	.44	.45	.44	.45	....	....
Asbestine, c-1 wks ton	13.00	15.00	13.00	15.00	13.00	15.00
Barium						
Barium Carbonate, precip, 200 lb. bags wks ton	56.50	61.00	56.50	61.00	56.50	61.00
Nat. (witherite) 90% gr. carlots wks bags ton	....	45.00	.....	45.00	.....	.....
Chlorate, 112 lb kegs NY lb.	.15	.16	.15	.16	.13½	.16
Chloride, 600 lb bbl wks ton	72.00	74.00	72.00	74.00	61.50	74.00
Dioxide, 88%, 690 lb drs lb.	.11	.13	.11	.13	.11	.13
Hydrate, 500 lb bbls lb.	.04½	.05	.04½	.05	.04½	.05
Nitrate, 700 lb casks lb.	....	.08½	.....	.08½	...	.07½
Barytes, Floated, 350 lb bbls wks ton	23.00	30.50	23.00	30.50	22.20	30.50
Bauxite, bulk, mines ton	5.00	6.00	5.00	6.00	5.00	6.00
Bayberry, bags lb.	.25	.30	.25	.30	.14½	.17
Beeswax, Yellow, crude bags lb.	.16	.17	.16	.19	.13	.20
Refined, cases lb.	.21	.22	.21	.23	.18	.26
White, cases lb.	.32	.35	.32	.35	.30	.35
Benzaldehyde, technical, 945 lb. drums wks lb.	.60	.65	.60	.65	.60	.65
Benzene, 90%, Industrial, 8000 gal tanks wks gal.	....	.20½	.....	.20½	.20	.22
Ind. Pure, tanks works gal.	....	.20½	.....	.20½	.20	.22
Benzidine Base, dry, 250 lb. bbls lb.	.67	.69	.67	.69	.65	.67
Benzoyl, Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech drs lb.	....	.30	.....	.30	...	.30
Beta-Naphthol, 250 lb bbl wk lb.	....	.24	.....	.24	...	.24
Naphthylamine, sublimed, 200 lb bbls. lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls lb.	.53	.58	.53	.58	.53	.58
Bismuth, metal	....	1.30	....	1.30	85	1.30
Bismuth Subnitrate	....	1.40	....	1.40	.95	1.40
Blackstrap, cane, (see Molasses, Blackstrap)						
Blanc Fixe, 400 lb bbls wks ton	42.50‡	70.00	42.50‡	70.00	42.50	75.00
Bleaching Powder, 800 lb drs c-1 wks contract 100 lb.	....	1.90	.....	1.90	1.75	1.90
Blood, Dried, fob, NY Unit	....	3.10	2.60	3.10	1.55	2.75
Chicago, high grade Unit	....	2.65	2.25	2.65	....	....
S. American shipt Unit	....	3.10	2.90	3.10	1.90	3.00
Blues, Bronze Chinese Milori						
Prussian Soluble lb.	.35½	.37½	.35½	.37½	...	.35
Bone, raw, Chicago ton	20.00	22.00	20.00	25.00	19.00	28.00
Bone Ash, 100 lb kegs lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls lb.	.05½	.08½	.05½	.08½	.05½	.08
Meal, 3% & 50%, Imp. ton	18.00	19.00	16.00	20.00	18.00	27.50
Borax, bags lb.	.018	.02	.018	.02	.018	.02
Bordeaux, Mixture, 16% pwd lb.	.10½	.14	.10½	.14	.11½	.13
Paste, bbls lb.	.10½	.14	.10½	.14	.10½	.13
Brazilwood, sticks, shpmt lb.	26.00	28.00	26.00	28.00	26.00	28.00
Bromine, cases lb.	.36	.43	.36	.43	.36	.43
Bronze, Aluminum, powd blk. lb.	.50	.75	.50	.75	.50	.75
Gold bulk lb.	.40	.55	.40	.55	.40	.55
Butanes, com 16.32° group 3 tanks lb.	.02½	.04	.02½	.04	.02½	.04
Butyl, Acetate, normal drs lb.	....	.11	.....	.11	.11	.139
Tank, wks lb.	....	.10	.....	.10	.10	.124
Secondary tanks, wks lb.	....	.08	....	.08	....	....
Aldehyde, 50 gal drs wks lb.	.35	.36	.35	.36	.31½	.36
Carbitol see Diethylene Glycol Mono (Butyl Ether)	....	....	.....	....	....	....
Cellosolve (see Ethylene glycol mono butyl ether)						
Furoate, tech., 50 gal. dr. lb.	....	.60	.....	.60	.50	.60
Lactate, drums lb.	....	.29	....	.29	....	....
Propionate, drs lb.	.20	.22	.20	.22	.20	.22
Stearate, 50 gal drs. lb.	.25	.25½	.25	.25½	.25	.25
Tartrate, drs lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes lb.	.65	.75	.65	.75	.65	.75
Calcium, Acetate, 150 lb bags c-1 100 lb.	....	3.00	.....	3.00	2.50	3.00
Arsenate, 100 lb bbls c-1 wks lb.	....	.06¾	.06¾	.07	.05½	.07
Carbide, drs lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bags c-1 lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-1 wks ton	....	19.50	.....	19.50	19 50	21.00
Solid, 650 lb drs c-1 fob wks ton	....	17.50	.....	17.50	17.50	18.00
Ferrocyanide, 350 lb. bbls. f.o.b. wks lb.	....	.17	.....	.17	.17	.17

†F. O. B. destination, 1931 prices are works prices.
‡Lowest price is for pulp; highest for high-grade precipitate.

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Calcium Furoate, tech, 100 lb. drums lb.	....	.30	.....	.30	....	.30
Nitrate, 100 lb bags ton	....	26.50	.....	26.50	24.00	26.50
Palmitate, bbls. lb.	.19	.20	.19	.20	.16	.19
Peroxide, 100 lb drs. lb.	....	1.25	.....	1.25	....	1.25
Phosphate, tech, 450 lb bbls. lb.	.07½	.08	.07½	.08	.07½	.08
Resinate, precip., bbls. lb.	.13	.14	.13	.14	....	....
Stearate, 100 lb. bbls. lb.	.17	.18	.17	.18	.12½	.18
Camphor, slabs lb.	.54	.56	.54	.59	.35½	.59
Powder lb.	.54	.56	.54	.59	.38	.59
Camwood, Bark, ground bbls. lb.	.16	.18	.16	.18	.16	.18
Candelilla Wax, bags lb.	.12	.13	.10½	.13	.09	.11
Carbitol, (See Diethylene Glycol Mono Ethyl Ether)	....	....	.....	.....	....	...
Carbon, Decolorizing, drums c-1 lb.	.08	.15	.08	.15	.08	.15
Black, 100-300 lb cases 1c-1 NY lb.	.07	.08½	.06½	.08½	.06	.12
Bisulfide, 500 lb drs 1c-1 NY lb.	.05½	.06	.05½	.06	.05½	.06
Dioxide, Liq. 20-25 lb cyl. lb.	....	.06	.. ..	.06	....	.06
Tetrachloride, 1400 lb drs delivered. lb.	.05½	.06	.05½	.06	.05½	.07
Carnauba Wax, Flor, bags lb.	.36	.38	.32	.38	.23	.33
No. 1 Yellow, bags lb.	.34	.36	.30	.36	.20	.35
No. 2 N Country, bags lb.	.22	.23	.20	.23	.14	.20
No. 3 N. C. lb.	.19½	.20	.16¼	.20	.11½	.17
No. 3 Chalky lb.	.19	.20½	.16	.20½	.12	.17
Casein, Standard, Domestic, ground lb	.12	.13	.11½	.13	.06½	.15
80-100 mesh carlots, bags. lb.	.13½	.14	.13	.14	....	....
Cellosolve (see Ethylene glycol mono ethyl ether)						
Acetate (see Ethylene glycol mono ethyl ether acetate) ..						
Celluloid, Scraps, Ivory cs. lb.	.13	.14	.13	.14	.13	.15
Shell, cases lb.	.18	.20	.18	.20	.18	.20
Transparent, cases lb.	....	.16	.....	.16	....	.16
Cellulose, Acetate, 50 lb kegs. lb.	.80	.90	.80	.90	.80	.90
Chalk, dropped, 175 lb bbls. lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks. lb.	.03	.04	.03	.04	.02	.03½
Light, 250 lb casks lb.	.03	.04	.03	.04	.02½	.03½
Charcoal, Hardwood, lump, bulk wks. bu.	.18	.19	.18	.19	.18	.19
Willow, powd, 100 lb bbl. wks lb.	.06	.06½	.06	.06½	.06	.06¼
Wood, powd, 100 lb bbls. lb.	.04	.05	.04	.05	.04	.05
Chestnut, clarified bbls wks. lb.	.01⅝	.01¾	.01⅝	.01¾	.01½	.02
25% tks wks lb.	....	.01½	.....	.01¾	.012	.01¾
Powd, 60%, 100 lb bgs wks. lb.	....	.04¾	.....	.04¾	....	.04¾
Powd, decolorized bgs wks. lb.	.05	.05½	.05	.05½	.04¾	.05
China Clay, lump, blk mines. ton	8.00	9.00	8.00	9.00	8.00	9.00
Powdered, bbls. lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls wks. ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, bulk ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine, cyls 1c-1 wks contract lb.	.07	.08½	.07	.08½	.07	.08½
cyls, cl., contract lb.	....	.05½†	.....	.05½†	....	.05½
Liq tank or multi-car lot cyls wks contract 100 lb.	....	1.85	.....	1.85	1.75	1.85
Chlorobenzene, Mono, 100 lb. drs 1c-1 wks lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs. lb.	....	.20	.....	.20	.15	.20
USP, tins lb.	....	.30	.....	.30	....	....
Chloropicrin, comml cyls. lb.	.90	1.25	.90	1.25	.90	1.35
Chrome, Green, CP lb.	.28	.29	.28	.29	.28	.29
Commercial lb.	.06½	.10	.06½	.10	.06½	.10
Yellow lb.	.15	.16	.15	.16	.14	.16
Chromium, Acetate, 8% Chrome bbls. lb.	.05	.05¾	.05	.05¾	.04¾	.05¾
20° soln, 400 lb bbls. lb.	....	.05½	.....	.05½	....	.05½
Fluoride, powd, 400 lb bbl. lb.	.27	.28	.27	.28	.27	.28
Oxide, green, bbls. lb.	.22	.23	.22	.23	.19	.23
Coal tar, bbls. bbl.	8.50	9.00	8.50	9.00	.50	9.00
Cobalt Acetate, bbls. lb.	.75	.80	.75	.80	....	....
Carbonate tech., bbls. lb.	1.34	1.40	1.34	1.40	....	....
Hydrate, bbls. lb.	1.66	1.76	1.66	1.76	....	....
Linoleate, paste, bbls. lb.	.39	.40	.39	.40	....	....
Resinate, fused, bbls. lb.	....	.12½	.....	.12½	....	....
Precipitated, bbls. lb.	.41	.42	.41	.42	.41	.42
Cobalt Oxide, black, bags. lb.	1.25	1.35	1.25	1.35	1.15	1.35
Cochineal, gray or black bag. lb.	.36	.42	.36	.42	.36	.42
Teneriffe silver, bags lb.	.37	.43	.37	.43	.37	.43
Copper, metal, electrol. 100 lb.	....	7.87½	7.87½	8.25	5.00	9.00
Carbonate, 400 lb bbls. lb.	....	.08¼	.....	.08½	.07	.08
52-54% bbls. lb.	....	.16¼	.....	.16½	.15½	.17½
Chloride, 250 lb bbls. lb.	.17	.18	.17	.18	.17	.18
Cyanide, 100 lb drs. lb.	.39	.40	.39	.40	.39	.40
Oleate, precip., bbls. lb.	....	.20	.....	.20	....	....
Oxide, red, 100 lb bbls. lb.	.12½	.17	.12½	.17	.14¾	.15
Resinate, precip., bbls. lb.	.18	.19	.18	.19	....	....
Stearate, precip., bbls. lb.	.35	.40	.35	.40	....	....
Sub-acetate verdigris, 400 lb bbls. lb.	.18	.19	.18	.19	.18	19
Sulfate, bbls c-1 wks. 100 lb.	....	3.75	.....	3.75	3.00	3.75
Copperas, crys and sugar bulk c-1 wks bags ton	14.00	14.50	14.00	14.50	14.00	14.50
Corn Syrup, 42 deg., bbls. 100 lb.	....	3.04	.....	3.04	2.61	3.04
43 deg., bbls. 100 lb.	....	3.09	.....	3.09	2.66	3.09
Cotton, Soluble, wet, 100 lb bbls. lb.	.40	.42	.40	.42	.40	.42
Cottonseed, S. E. bulk c-1. ton		*(See Oils and Fats News Section)*				
7% Amm., bags mills. ton	13.25	38.00	13.25	38.00	13.25	38.00
Cream Tartar, USP, 300 lb. bbls. lb.	.17½	.17¾	.17½	.17¾	.14½	.17¾
Creosote, USP, 42 lb cbys. lb.	.45	.47	.45	.47	.40	.47
Oil, Grade 1 tanks gal.	.11	.12	.11	.12	.11	.12
Grade 2 gal.	.10	.12	.10	.12	.10	.12
Grade 3 gal.	.09	.12	.09	.12	.09	.12
Cresol, USP, drums lb.	....	.11	.....	.11	.10½	.11
Crotonaldehyde, 98% 50 gal dr. lb.*	.26	.30	.26	.30	.32	.36

†Delivered. *Lower price is for carlots.

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PLUS CHARGES

Cudbear
Fusel Oil

Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Cudbear, English....lb.	.19	.25	.19	.25	.16	.25
Cutch, Rangoon, 100 lb bales.lb.	....	.02¾	.....	.02¾	.02½	.03
Borneo, Solid, 100 lb bale...lb.	....	.04½	.....	.04½	.02½	.04½
Philippine, 100 lb. bale....lb.	.03½	.04½	.03½	.04½	....	....
Cyanamide, bags c-1 frt allowed Ammonia unit.....	....	1.07½	.....	1.07½	.97½	1.07½
Dextrin, corn, 140 lb bags.100 lb.	3.62	3.82	3.62	3.82	2.89	3.84
British Gum, bags .....100 lb.	3.87	4.07	3.87	4.07	3.89	3.92
White, 140 lb bags.....100 lb	3.47	3.67	3.47	3.67	2.94	3.79
Potato Yellow, 220 lb bgs..lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.09
White, 220 lb bags 1c-1....lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 lb bags 1c-1...lb.	.06¾	.07¾	.06¾	.07¾	.06¾	.08
Diamylether, wks., drums....lb.	.60	.77	.60	.77	....	....
Diamylphthalate, drs wks...gal.	....	.20½	.....	.20½	....	....
Dianisidine, barrels.....lb.	2.35	2.45	2.35	2.45	2.35	2.70
Dibutylphthalate, wks.....lb.	.20½	.21	.20½	.21	.20½	.22
Dibutyltartrate, 50 gal drs...lb.	.29½	.31½	.29½	.31½	.29½	.21
Dichlorethylene, drums....gal.	.29	....	.29	....	....	....
Dichloroethylether, 50 gal drs lb.	....	.21	.....	.21	.16	.21
Dichloromethane, drs wks....lb.	....	.15	.....	.15	....	....
Diethylamine, 400 lb drs.....lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylcarbonate, com. drs...lb.	....	.35	.....	.35	....	....
90% grade, drs.....lb.	....	.25	.....	.25	....	....
Diethylaniline, 850 lb drs....lb.	.52	.55	.52	.55	.52	.55
Diethyleneglycol, drs.....lb.	.14	.16	.14	.16	.14	.16
Mono ethyl ether, drs...lb.	.15	.16	.15	.16	.15	.16
Mono butyl ether, drs...lb.	....	.26	.....	.26	....	.26
Diethylene oxide, 50 gal drs..lb.	.26	.27	.26	.27	.26	.27
Diethylorthotoluidin, drs.....lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb. drums.....lb.	.26	.27	.26	.27	.20	.26
Diethylsulfate, technical, 50 gal drums.....lb.	....	....	....	....	....	....
Digtycol Oleate, bbls.....lb.	....	.16	.....	.16	....	....
Dimethylamine, 400 lb drs, pure 25 & 40% sol. 100% basis.lb.	....	1.20	.....	1.20	....	....
Dimethylaniline, 340 lb drs...lb.	.29	.30	.29	.30	.25	.28
Dimethyl phthalate drs.....lb.	....	.24½	.....	.24½	....	....
Dimethylsulfate, 100 lb drs...lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls...lb.	.17	.19½z	.17	.19½z	....	.18
Dintrochlorobenzene, 400 lb bbls.....lb.	.14½	.15½	.14½	.15½	.13	.15
Dinitronaphthalene, 350 lb bbls .....lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls....lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls....lb.	.15½	.16½	.15½	.16½	.15	.17
Dioxan (See Diethylene Oxide)..	....	....	.....	.....	....	....
Diphenyl.....lb.	.15	.25	.15	.25	.15	.40
Diphenylamine.....lb.	.31	.34	.31	.34	.31	.34
Diphenylguanidine, 100 lb bbl lb.	.36	.37	.36	.37	.30	.37
Dip Oil, 25%, drums.....lb.	.23	.25	.23	.25	.23	.25
Divi Divi pods, bgs shipmt..ton	....	36.00	.....	36.00	26.00	36.00
Extract.....lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, 200 lb cases .....lb.	.44	.45	.40	.45	.40	.43
Epsom Salt, tech, 300 lb bbls c-1 NY... .....100 lb.	....	2.20	.....	2.20	....	2.20
Ether, USP anaesthesia 55 lb. drs. .....lb.	....	.24	.....	.24	.22	.24
(Conc).....lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal. drums ...lb.	.07‡x	.08	.07‡x	.08	.07	.08
Synthetic, wks, drums.....lb.	.08	.09	.08	.09	....	....
Ethyl Acetate, 85% Ester tanks.....lb.	.07½	.08	.07½	.08	.07½	.09
drums.....lb.	.08½	.09	.08½	.09	.08½	.10
Anhydrous, tanks.....lb.	.09	.10	.09	.10	.09	.10
drums.....lb.	.10	.10½	.10	.10½	.10	.10½
Acetoacetate, 50 gal drs....lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs...lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drums.....lb.	.50	.55	.50	.55	.50	.55
Chloride, 200 lb drums.....lb	....	.24	.....	.24	.22	.24
Chlorocarbonate cbys.....lb.	....	.30	.....	.30	....	.30
Crotonate, drums.....lb.	1.09	1.25	1.00	1.25	....	....
Ether, Absolute, 50 gal drs.lb.	.50	.52	.50	.52	.50	.52
Furoate, 1 lb tins.....lb.	....	1.00	.....	1.00	1.00	5.00
Lactate, drums works....lb.	.25	.29	.25	.29	.25	.29
Methyl Ketone, 50 gal drs..lb.	....	.12½	.....	.12½	....	.12½
Oxalate, drums works.....lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs wks lb.	.30	.30½	.30	.30½	.30	.30½
Ethylene Dibromide, 60 lb dr..lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys. chloro, cont.....lb.	.75	.85	75	.85	.75	.85
Dichloride, 50 gal drums....lb.	.05½	.06½	.05½	.06½	.05	.09
Glycol, 50 gal drs wks.....lb.	.26	.28	.26	.28	.25	.28
Mono Butyl Ether drs wks.	....	.20	.....	.20	....	.20
Mono Ethyl Ether drs wks	.15	.17	.15	.17	.15	.17
Mono Ethyl Ether Acetate dr. wks.....	.16½	.18	.16½	.18	.16½	.18
Mono Methyl Ether, drs..lb.	.21	.23	.21	.23	.21	.23
Stearate.....	.18	.18	.18	.18	.18	.18
Oxide, cyl.....lb.	....	.75	.....	.75	....	.75
Ethylidenaniline.....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, bulk pottery .....ton	....	14.50	.....	14.50	14.00	16.50
Powdered, bulk works....ton	13.50	14.50	13.50	14.50	13.50	14.50
Ferric Chloride, tech, crystal 475 lb bbls.....lb.	.05	.07½	.05	.07½	.04½	.07½
Fish Scrap, dried, wks.....unit	....	2.50*	.....	2.50*	1.85	2.75*
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit	....	2.50†	.....	2.50†	1.85	2.50†
Fluorspar, 98%, bags.....28.00		35.50	28.00	35.50	28.00	35.50
Formaldehyde, aniline, 100 lb. drums.....lb.	.37½	.42	.37½	.42	.37½	.42
USP, 400 lb bbls wks.....lb.	.06	.07	.06	.07	.06	.07
Fossil Flour.....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, bulk, mines...ton	15.00	20.00	15.00	20.00	15.00	20.00
Imp. powd c-1 bags.....ton	24.00	30.00	24.00	30.00	24.00	30.00
Furfural (tech.) drums wks,. .lb.	.10§	.15	.10§	.15	.10	.15
Furfuramide (tech) 100 lb dr..lb.	....	.30	.....	.30	....	.30
Furfuryl Acetate, 1 lb tins....lb.	....	5.00	.....	5.00	....	5.00
Fusel Oil, 10% impurities....lb.	.16	.18	.16	.18	.14½	.18

*& 10; †& 50 xTanks 2c lower.

‡Higher price, refined. §Tanks, 1c lower zHigher price is for purified.

Current

	Current Market		1934 Low	1934 High	1933 Low	1933 High
Fustic, chips lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb boxes lb.	.20	.23	.20	.23	.18	.23
Liquid 50°, 600 lb bbls lb.	.08½	.12	.08½	.12	.07	.10
Solid, 50 lb boxes lb.	.16	.18	.16	.18	.14	.18
Sticks ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls lb.	.42	.43	.42	.43	.42	.43
Gall Extract lb.	.18	.20	.18	.20	.18	.20
Gambier, common 200 lb cs. lb.	.04	.05½	.04	.05½	.03	.07
Singapore cubes, 150 lb bg. lb.	.06	.07	.06	.07	.05½	.08
Gelatin, tech, 100 lb cases lb.	.45	.50	.45	.50	.45	.50
Glauber's Salt, tech, c-l wks. 100 lb.	1.10	1.30	1.10	1.30	1.00	1.70
Glucose (grape sugar) dry 70-80° bags c-l NY 100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb bags 100 lb.	....	2.33	.....	2.33	....	2.33
Glue, medium white, bbls lb.	.13½	.19	.13½	.19	.12	.23
Pure white, bbls lb.	.23	.28	.23	.28	.18	.28
Glycerin, CP, 550 lb drs lb.	.12	.12½	.11	.12½	.10½	.11
Dynamite, 100 lb drs lb.	.11½	.11½	.10	.11½	.07½	.10½
Saponification, tanks lb.	.08	.08½	.06¾	.08½	.05	.08
Soap Lye, tanks lb.	.07¼	.07½	.06¼	.07½	.04	.06¼
Glyceryl Stearate, bbls lb.	....	.18	.....	.18	.17	.18
Graphite,						
Crystalline, 500 lb. bbls lb.	.04	.05	.04	.05	.04	.05
Flake, 500 lb bbls lb.	.08	.16	.08	.16	.08	.16
Amorphous bbls lb.	.03	.04	.03	.04	.03	.04
Gums						
Gum Accroides, Red, coarse and fine 140-150 lb bags lb.	.03¾	.04½	.03¾	.04½	.03¾	.04½
Powd, 150 lb bags lb.	.06	.06½	.06	.06½	.06	.06½
Yellow, 150-200 lb bags lb.	.18	.20	.18	.20	.18	.20
Aloes, Barbadoes lb.	.87	.90	.85	.90	.85	.90
Animi (Zanzibar) bean & pea 250 lb cases lb.	.35	.40	.35	.40	.35	.40
Glassy, 250 lb cases lb.	.50	.55	.50	.55	.50	.55
Arabic, amber sorts lb.	.08¼	.08¾	.07¾	.08¾	.05¾	.08¼
Asphaltum, Barbadoes (Manjak) 200 lb bags lb.	.03	.06	.03	.06	.03	.05
Egyptian, 200 lb cases lb.	.13	.15	.13	.15	.13	.15
Ester, light lb.	.06½	.06¾	.06	.06¾	....	....
Gamboge, pipe, cases lb.	.57	.60	.57	.60	.42	.65
Powdered, bbls lb.	.67	.70	.67	.70	.50	.70
Gilsonite Selects, 200 lb bags ton	30.50	32.90	30.50	32.90	30.50	32.90
Damar Batavia standard 136, lb. cases lb.	.13	.13½	.13	.13½	.08½	.15½
Batavia Dust, 160 lb bags lb.	.06½	.07	.06¼	.07	.04	.07½
E Seeds, 136 lb cases lb.	.09	.09½	.08	.09½	.05½	.09½
F Splinters, 136 lb cases and bags lb.	.05½	.06	.05½	.06	.05½	.06
Singapore, No. 1, 224 lb cases lb.	.16½	.17½	.16½	.18	.09½	.18
No. 2, 224 lb cases lb.	.10½	.11	.10½	.11	.07	.11½
No. 3, 180 lb bags lb.	.06½	.07	.06½	.07	.04½	.07½
Benzoin Sumatra, U. S. P. 120 lb. cases lb.	.21	.23	.21	.23	.17	.23
Copal Congo, 112 lb bags, clean opaque lb.	.27½	.28	.27½	.28	.16½	.28
Dark, amber lb.	.09	.10	.09	.10½	.06	.10½
Light, amber lb.	.15	.19	.15	.19	.08	.19
Water, white lb.	.46	.47	.46	.48	.37	.48
Kino, tins lb.	.75	.80	.75	.80	....	....
Mastic lb.	.37½	.40	.37½	.40	.26½	.40
Manila 180-190 lb baskets						
Loba A lb.	.12½	.13	.12½	.14½	.09	.13½
Loba B lb.	.11½	.12½	.11½	.13½	.08	.13
Loba C lb.	.11½	.12	.11	.12	.07	.12
M A Sorts lb.	.06½	.07½	.06½	.07½	.05	.07
D B B Chips lb.	.09	.09½	.08½	.09½	.05½	.09½
East Indies chips, 180 lb bags lb.	.04½	.05	.04½	.05	.04	.07
Pale bold, 224 lb cs lb.	.16	.17	.16	.17	.05½	.17
Pale nubs, 180 lb bags lb.	.11	.13	.11	.13	.05	.13
Pontianak, 224 lb cases						
Bold gen No. 1 lb.	.18½	.19	.17½	.19	.14	.18½
Gen. chips spot lb.	.07¼	.08	.07½	.08	.05	.08
Elemi, No. 1, 80-85 lb cs lb.	.10½	.11	.10½	.11½	.09	.12½
No. 2, 80-85 lb cases lb.	.10¼	.10¾	.10½	.11¼	.08½	.12
No. 3, 80-85 lb cases lb.	.08	.08½	.08	.08½	.08	.08½
Ghatti, sol. bags lb.	.09	.09½	.09	.09½	.06	.09½
Karaya, pow. bbls xxx lb.	.23	.25	.23	.25	....	....
xx lb.	.15	.16	.15	.16	....	....
No. 1 lb.	.10	.11	.10	.11	....	....
No. 2 lb.	.08	.09	.08	.09	....	....
Kauri, 224-226 lb cases No. 1 lb.	.20	.25	.20	.25	.20	.25
No. 2 fair pale lb.	.12½	.16	.12½	.16	.12½	.16
Brown Chips, 224-226 lb. cases lb.	.06½	.08½	.06½	.08½	.06½	.12
Bush Chips, 224-226 lb. cases lb.	.22	.24	.22	.24	.22	.24
Pale Chips, 224-226 lb cases lb.	.11	.14	.11	.14	.11	.14
Sandarac, prime quality, 200 lb. bags & 300 lb. casks lb.	.48	.50	.48	.50	.21	.50
Senegal, picked bags lb.	.17	.18	.17	.18	....	....
Sorts lb.	.08	.08½	.08	.08½	....	....
Thus, bbls 280 lbs.	....	9.50	.....	9.50	....	....
Strained 280 lbs.	....	9.50	.....	9.50	....	....
Tragacanth, No. 1 bags lb.	....	1.00	.....	1.00	.65	1.00
Yacca, bags lb.	....	.04	.....	.04	....	....
Hematine crystals, 400 lb bbls lb.	.16	.18	.16	.18	.10	.18
Paste, 500 bbls lb.	....	.11	.....	.11	....	.11
Hemlock 25%, 600 lb bbls wks lb.	.03½	.04½	.03½	.04½	.03½	.04½
Bark ton	....	16.00	.....	16.00	....	16.00
Hexalene, 50 gal drs wks lb.	....	.30	.....	.30	....	.30
Hexane, normal 60-70° C. Group 3, tanks gal.	....	.14	.....	.14	....	....
Hexamethylenetetramine, drs lb.	.37	.39	.37	.39	....	....
Hoof Meal, f.o.b. Chicago unit	1.85	1.90	1.85	1.90	.75	1.75
South Amer. to arrive unit	1.65	1.75	1.65	1.75	1.40	1.75
Hydrogen Peroxide, 100 vol, 140 lb cbys lb.	.20	.21	.20	.21½	.20	.21

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Denatured Alcohol
Formaldehyde
Borax
Phenol U. S. P.
Benzol
Toluol
Xylol
Whiting
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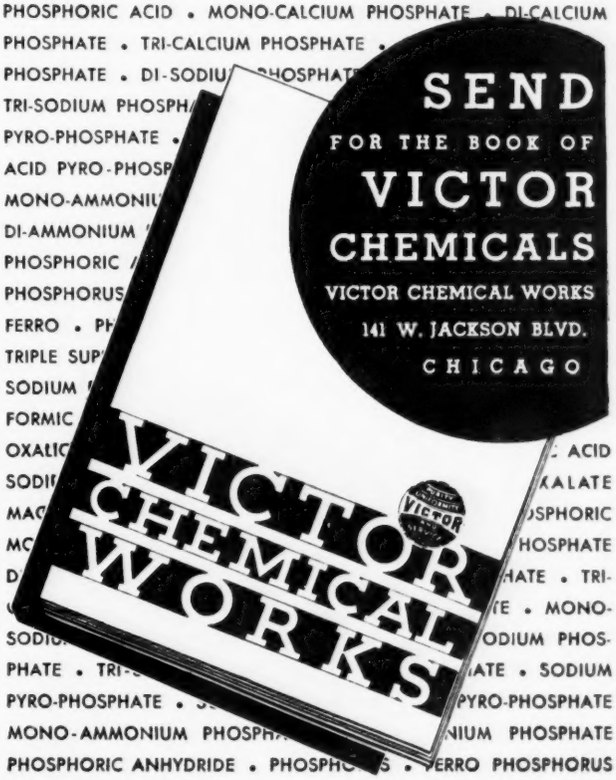

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Hydroxyamine Hydro.
Myrobalans

Prices

		Current Market	1934 Low	1934 High	1933 Low	1933 High
Hydroxyamine Hydrochloride	lb.	....	3.15	.....	3.15	....	3.15
Hypernic, 51°, 600 lb bbls.	lb.	.17	.20	.17	.20	.11	.20
Indigo Madras, bbls.	lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drums	lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid	lb.	....	.12	.....	.12	....	.12
Iodine, crude	per kilo	....	15s 1d	.....	15s 1d	....	....
Resublimed, kegs	lb.	2.25	2.30	2.25	2.30	2.10	3.40
Irish Moss, ord. bales	lb.	.07	.08	.07	.08	....	....
Bleached, prime, bales	lb.	.14	.15	.14	.15	....	....
Iron Acetate Liq. 17°, bbls.	lb.‡	.03	.04	.03	.04	....	....
Iron Chloride see Ferric or Ferrous							
Nitrate, kegs	lb.	.09	.10	.09	.10	.09	.10
Coml, bbls	100 lb.	2.75	3.25	2.75	3.25	2.50	3.25
Oxide, English	lb.	.08¾	.09	.08¾	.09	.04	.07
Isopropyl Acetate, tanks	lb.	..	07	.07	.07	....	....
Japan Wax, 224 lb cases	lb.	.06½	.07	.06	.08	.05½	.08
Keiselguhr, 95 lb bgs NY							
Brown	ton	60.00	70.00	60.00	70.00	60.00	70.00
Lead Acetate, bbls wks.	100 lb.	....	9.50	.....	9.50	8.50	9.50
White crystals, 500 lb bbls wks.	100 lb.	....	10.50	.....	10.50	9.50	10.50
Arsenate, drs lc-l wks.	lb.	.10	.18	.10	.18	.09	.10½
Dithiofuroate, 100 lb dr.	lb.	....	1.00	.....	1.00	....	1.00
Linoleate, solid bbls.	lb.	.26	.26½	.26	.26½	....	....
Metal, c-l NY	100 lb.	....	4.00	4.00	4.15	3.00	4.50
Nitrate, 500 lb bbls wks.	lb.	.10	.14	.10	.14	.10	.14
Oleate, bbls.	lb.	.15	.16	.15	.16	.15	.16
Lead Oxide Litharge, 500 lb. bbls.	lb.	....	.06¾	.....	.06¾	.05½	.07
Red, 500 lb bbls wks.	lb.	....	.07¾	.....	.07¾	.06½	.08
Resinate, precip., bbls.	lb.	.18	.18½	.18	.18½	....	....
Stearate, bbls.	lb.	.22	.23	.22	.23	....	....
White, 500 lb bbls wks.	lb.	.06½	.07	.06½	.07	.06	.07
Sulfate, 500 lb bbls wk.	lb.	....	.06	.....	.06	.05½	.06
Lime, ground stone bags	ton	....	4.50	.....	4.50	....	4.50
Live, 325 lb bbls wks.	bbl.	....	1.70	.....	1.70	....	....
Lime Salts, see Calcium Salts							
Lime-Sulfur soln bbls.	gal.	.14	.33	.14	.33	.15	.17
Linseed cake, bulk	ton	....	27.00	24.50	27.00	17.50	27.50
Linseed Meal	ton	....	37.00	.....	37.00	28.00	37.00
Lithopone, 400 lb bbls lc-l wks	lb.	.04¾	.05	.04¾	.05	.04¾	.05
Logwood, 51°, 600 lb bbls.	lb.	.08½	.12½	.08½	.12½	.05	.12½
Solid, 50 lb boxes	lb.	.14½	.17½	.14½	.17½	.08	.17½
Sticks	ton	24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch	lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl.	ton	55.00	60.00	55.00	60.00	46.00	65.00
Magnesium Carb, tech, 70 lb bags NY	lb.	....	.06½	.....	.06½	.05¾	.06½
Chloride flake, 375 lb. drs c-l wks.	ton	36.00	39.00	34.00	39.00	34.00	36.00
Imported shipment	ton	31.75	33.00	31.75	33.00	31.75	33.00
Fused, imp., 900 lb bbls NY	ton	....	31.00	.....	31.00	....	31.00
Fluosilicate, crys, 400 lb bbls. wks.	lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls.	lb.	....	.42	.....	.42	....	.42
Heavy, 250 lb bbls.	lb.	....	.50	.....	.50	....	.50
Palmitate, bbls.	lb.	.21	.22	.21	.22	....	....
Peroxide, 100 lb cs.	lb.	1.20	1.25	1.20	1.25	1.00	1.25
Silicofluoride, bbls.	lb.	.10	.11	.10	.11	.08½	.11
Stearate, bbls.	lb.	.19	.20	.19	.20	.16½	.20
Manganese Borate, 30%, 200 lb. bbls.	lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb casks	lb.	.07	.08	.07	.08	.07	.08
Dioxide, tech (peroxide) drs	lb.	.03¾	.06	.03¾	.06	.03½	.06
Linoleate, lig. drums	lb.	.18	.19	.18	.19	....	....
Resinate, fused, bbls.	lb.	.08½	.08½	.08¼	.08½	....	....
precip., bbls.	lb.	.11½	.12½	.11½	.12½	....	....
Sulfate, 550 lb drs NY	lb.	....	.08	.....	.08	.07	.08
Mangrove 55%, 400 lb bbls.	lb.	....	.04	.....	.04	....	.04
Bark, African	ton	....	30.00	29.00	31.00	22.00	31.00
Marble Flour, bulk	ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercuric chloride	lb.	.82	.87	.82	.87	.67	.87
Mercury metal	76 lb flask	74.00	76.00	66.50	76.00	48.00	69.00
Meta-nitro-aniline	lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-para-toluidine 200 lb. bbls.	lb.	1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb. bbls.	lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb. bbls.	lb.	.67	.69	.67	.69	.67	.69
Methanol, (Wood Alcohol)							
*Crude, tanks	gal.	....	.25	.....	.25	.20	.20
95% tanks	gal.	.33	.35	.33	.35	.33	.35
97% tanks	gal.	.34	.39	.34	.39	.34	.39
*Pure, Synthetic drums cars	gal.	....	.40	.....	.40	.37½	.40
*Synthetic tanks	gal.	....	.35½	.....	.35½	....	.35½
*Denat. grade, tanks	gal.	....	.40	.....	.40	.35	.40
Methyl Acetate drums 82%	gal.	.12	.13	12	.13	.12	.13
99% tanks	gal.	....	.15	.....	.15	....	.15
Acetone, drums	gal.	.54½	.57	.54½	.57	.42	.57
Hexyl Ketone, pure	lb.	....	1.20	.....	1.20	....	1.20
Anthraquinone	lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tanks	lb	....	.10½	.10½	.10½	....	....
Cellosolve, (See Ethylene Glycol Mono Methyl Ether)		....	....	.....	.....	....	....
Chloride, 90 lb cyl.	lb.	.45	.45	.45	.45	.45	.45
Ethyl Ketone, tanks	lb.	....	.07½	.07½	.07½	....	....
Mica, dry grd. bags wks.	lb.	65.00	80.00	65.00	80.00	65.00	80.00
Michler's Ketone, kegs	lb.	....	2.50	.....	2.50	2.50	3.00
Molasses, blackstrap, tanks f.o.b. N. Y.	gal.	.08½	.09	.06½	.09	.04½	.07
Monochlorobenzene, drums, see Chlorobenzene, mono	lb.						
Monomethylparaminosulfate 100 lb drums	lb.	3.75	4.00	3.75	4.00	3.75	4.00
Montan Wax, crude, bags	lb.	.10½	.11	.10	.11	.03¾	.10
Myrobalans 20%, liq bbls.	lb.	.03¾	.04¼	.03¾	.04½	.03¾	.04½
50% Solid, 50 lb boxes	lb.	.06	.06¼	.06	.06½	.05	.06½

*delivered basis (east of Miss. River) †As of Sept. 1, $2.56.
‡Higher price is for lcl quantities.

	Current Market	1934 Low	1934 High	1933 Low	1933 High
J1 bags ton	....	32.00	.....	32.00	27.00	35.00
J2 bags ton	17.50	18.50	17.50	18.50	15.50	22.75
R2 bags ton	16.75	17.00	16.75	18.00	15.00	22.00
Naphtha, v.m.& p. (deodorized) tanks, Group 3 tanks gal.	.06⅞	.07¼	.06⅞	.07¼	....	....
Bayonne, tanks lb.	....	.09½	.....	.09½	.08½	.09½
Naphthalene balls, 250 lb bbls wks lb.	.06	.07	.06	.07	.05½	.07
Crude, imp. 100 lb.	....	2.15	.....	2.15	1.75	2.15
Crushed, chipped bgs wks lb.	....	.05	.....	.05	....	.05
Flakes, 175 lb bbls wks lb.	....	.07¼	.....	.07¼	....	.07¼
Nickel Chloride, bbls lb.	.18	.19	.18	.19	.17	.19
Oxide, 100 lb kegs NY lb.	.35	.37	.35	.37	.35	.37
Salt bbl. 400 bbls lb NY lb.	.11½	.12	.11½	.12	.11	.13
Single, 400 lb bbls NY lb.	.11½	.12	.11½	.12	.11	.12
Metal ingot lb.	.35	.35	.35	.35	.35	.35
Nicotine, free 40%, 8 lb tins, cases	8.25	10.15	8.25	10.15	....	....
Sulfate, 55 lb. drums lb.	.67	.75	.67	.75	.67	.75
Nitre Cake, bulk ton	12.00	14.00	12.00	14.00	10.00	14.00
Nitrobenzene, redistilled, 1000 lb drs wks* lb.	.08½	.11	.08½	.11	.08½	.11
Nitrocellulose, c-l-l-cl, wks lb.	.27	.33	.27	.33	.27	.33
Nitrogenous Material, bulk unit	....	2.85	2.40	2.85	1.50	3.50
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Aleppy, bags lb.	....	.18	.....	.18	....	.18
Chinese, bags lb.	.17	.18	.17	.18	.17	.18
Oak Bark, ground ton	30.00	35.00	30.00	35.00	30.00	35.00
Whole ton	20.00	23.00	20.00	23.00	20.00	23.00
Extract, 25% tannin, bbls. lb.	.03⅜	.03½	.03⅜	.03½	....	....
Orange-Mineral, 1100 lb casks NY lb.	....	.10½	.....	.10½	09½	.10¼
Orthoaminophenol, 50 lb kgs. lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	1.00	1.15	1.00	1.15	1.00	1.15
Orthochlorophenol, drums lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drums lb.	.13	.15	.13	.15	.13	.15
Orthodichlorobenzene, 1000 lb. drums lb.	.05½	.06	.05½	.06	05½	.06
Orthonitrochlorobenzene, 1200 lb drs wks lb.	.28	.29	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs wk lb.	.05½	.06	.05½	.06	.05½	.06
Orthonitrophenol, 350 lb dr. lb.	.52	.80	.52	.80	.52	.90
Orthotoluidine, 350 lb bbl lc-l lb.	.14	.15	.14	.15	.14	.22
Orthonitroparachlorphenol, tins lb.	.70	.75	.70	.75	.70	.75
Osage Orange, crystals lb.	.16	.17	.16	.17	.16	.17
51 deg. liquid lb.	.07	.07½	.07	.07½	.06	.07½
Powdered, 100 lb bags lb.	.14½	.15	.14½	.15	.14½	.15
Paraffin, refd, 200 lb cs slabs 123-127 deg. M. P. lb.	.04½	.04½	.04½	.04½	.02	.04½
128-132 deg. M. P. lb.	....	.04¾	.....	.04¾	.03½	.04¾
133-137 deg. M. P. lb.	.05	.05¼	.05	.05¼	.043	.05¼
Para Aldehyde, 110-55 gal drs lb.*	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb bg. lb.	.52	.60	.52	.60	.52	.60
Aminohydrochloride, 100 lb. kegs lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kegs lb.	.78	.80	.78	.80	.78	.80
Chlorophenol, drums lb.	.50	.65	.50	.65	.50	.65
Coumarone, 330 lb drums lb.	....	....	.....	.....	....	....
Cymene, refd, 110 gal dr. gal.	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks lb.	.16	.20	.16	.20	.15	.18
Nitroacetanilid, 300 lb bbls lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls wks lb.	.48	.55	.48	.55	.48	.55
Nitrochlorobenzene, 1200 lb drs wks lb.	.23½	.24	.23½	.24	.23½	.26
Nitro-orthotoluidine, 300 lb. bbls lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol 185 lb bbls lb.	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb. bbls lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	.35	.37	.35	.37	.29	.37
Phenylenediamine, 350 lb bbls lb.	1.25	1.30	1.25	1.30	1.15	1.30
Toluenesulfonamide, 175 lb bbls lb.	.70	.75	.70	.75	.70	.75
Toluenesulfonchloride, 410 lb bbls wks lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls wk. lb.	.56	.60	.56	.60	.56	.60
Paris Green, Arsenic Basis 100 lb kegs lb.	....	.23	.....	.23	....	.24
250 lb kegs lb.	....	.22	.....	.22	....	.23
Perchlorethylene, 50 gal. dr. lb	....	.15	.....	.15	....	....
Persian Berry Ext., bbls lb.	.25	Nom.	.25	Nom	.25	Nom
Pentane, normal, 28-38° C, group 3, tanks gal.	....	.09	.....	.09	....	....
Pentasol (see Alcohol, Amyl)						
Pentasol Acetate (see Amyl Acetate)						
Petrolatum, Green, 300 lb bbl. lb.	.01⅞	.02	.01⅞	.02	.01⅞	.02
Petroleum Ethers, tanks 30-60°, Group 3 gal.	....	.13	.11	.13	.10	.11
Petroleum solvents and diluents Cleaners' naphtha, Group 3, tanks gal.	.06⅞	.07⅛	.06⅞	.07⅛	.05	.07⅛
Lacquer diluents, Bayonne tanks gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tanks gal.	.06⅞	.07⅛	.06⅞	.08⅛	.06½	.08⅛
Petroleum thinner 47-49 deg. tanks, Group 3 gal.	.05⅞	.06⅛	.05⅞	.06⅛	....	....
Rubber solvent, stand. grade tanks, Group 3 gal.	....	.06⅞	.....	.06⅞	.05	.06⅞
East Coast tanks gal.	....	.09½	.....	.09½	.09	.09½
Stoddard solvents 48-50 deg. tanks, Group 3 gal.	.06⅜	.06⅝	.06⅜	.07⅛	.04½	.06⅝
East Coast tanks gal.	....	.09½	.....	.09½	.09	.09½
Phenol, 250-100 lb drums lb.	.14½	.15	.14½	.15	.14½	.15
Phenyl-Alpha-Naphthylamine, 100 lb kegs lb.	....	1.35	.....	1.35	....	1.35

*Higher price is for lcl quantities.

R. W. Greeff & Co., Inc.
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Methyl Ethyl Ketone
Methyl Propyl Ketone

●

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Secondary Amyl Acetate
Secondary Butyl Alcohol
Secondary Butyl Acetate

●

Tertiary Butyl Alcohol

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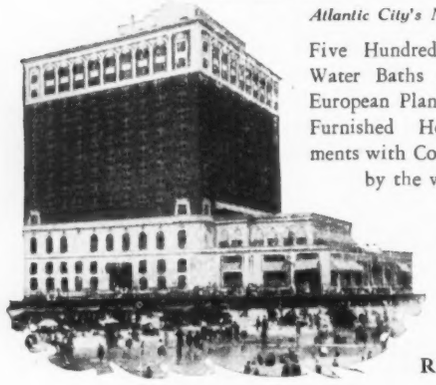

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Phenyl Chloride
Rosin

Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Phenyl Chloride, drums.....lb.	....	.16	.....	.16	....	....
Phenylhydrazine Hydrochloride .....lb.	2.90	3.00	2.90	3.00	2.90	3.00
Phosphate Acid (see Superphosphate)						
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis..ton	2.85	3.20*	2.85	3.20*	2.75	3.25
70% basis.....ton	3.35	3.70*	3.35	3.70*	3.25	3.90
72% basis.....ton	3.85	4.20*	3.85	4.20*	3.75	4.35
75-74% basis.....ton	4.90	5.30*	4.90	5.30*	4.75	5.50
75% basis.....ton	5.05	5.40*	5.05	5.40*	4.85	5.75
77-80% basis.....ton	5.90	6.20*	5.90	6.20*	5.75	6.30
Tennessee, 72% basis.....ton	....	5.00*	.....	5.00*	....	5.00
Phosphorous Oxychloride 175 lb cyl.....lb.	.16	.20	.16	.20	.16	.23
Red, 110 lb cases.....lb.	....	.45	.....	.45	.40	.45
Yellow, 110 lb cases wks.lb.	.28	.33	.28	.33	.27½	.33
Sesquisulfide, 100 lb cs.....lb.	.38	.44	.38	.44	.38	.44
Trichloride, cylinders.....lb.	.16	.20	.16	.20	.16	.23
Phthalic Anhydride, 100 lb bbls wks.....lb.	.14½	.15	.14½	.15	.13½	.16
Pigments Metallic, Red or brown bags, bbls, Pa. wks.....ton	37.00	45.00	37.00	45.00	37.00	45.00
Pine Oil, 55 gal drums or bbls						
Destructive dist.....lb.	.59	.62	.59	.62	.59	.62
Steam dist. wat. wh. bbls..gal.	.64	.65	.64	.65	....	....
Prime bbls.....bbl.	8.00	10.60	8.00	10.60	8.00	10.60
Pitch Hardwood..... wks.....ton	....	20.00	.....	20.00	20.00	25.00
Plaster Paris, tech, 250 lb bbls .....bbl.	3.40	3.50	3.40	3.50	3.30	3.50
Platinum, Refined.....oz.	37.00	38.00	37.00	38.00	24.00	38.00
Pontol, tanks .....per gal.	....	.54	.....	.54	....	.54
Potash, Caustic, wks, solid...lb.	.07½	.07⅝	.07½	07⅝	.06½	.07⅝
flake.....lb.	.0803	.08½	.0803	.08½	.0705	.08½
Liquid, tanks .....lb.	....	.03⅝	.....	.03⅝	....	....
Potash Salts, Rough Kainit 12.4% basis bulk.....ton	....	9.20	.....	9.20	....	9.20
14% basis.....ton	....	9.70	.....	9.70	....	9.70
Manure Salts.....						
20% basis bulk.....ton	....	12.00	.....	12.00	....	12.00
30% basis bulk.....ton	....	19.15	.....	19.15	....	19.15
Potassium Acetate.....lb.	.27	.28	.27	.28	.27	.28
Potassium Muriate, 80% basis bags.....ton	....	37.15	.....	37.15	....	37.15
Pot. & Mag. Sulfate, 48% basis bags.....ton	....	25.00	.....	25.00	25.00	27.80
Potassium Sulfate, 90% basis bags.....ton.	....	42.15	....	42.15	42.15	47.50
Potassium Bicarbonate, USP, 320 lb bbls.....lb.	.07½	.09	.07½	.09	.07½	.09
Bichromate Crystals, 725 lb casks.....lb.	.08½	.08⅝	.08½	.08⅝	.07½	.08⅝
Binoxalate, 300 lb bbls.....lb.	.14	.17	.14	.17	.14	.17
Bisulfate, 100 lb kegs.....lb.	.16	.30	.16	.30	.16	.30
Carbonate, 80-85% calc. 800 lb casks.....lb.	.07	.07½	.07	.07½	.04½	.07½
Chlorate crystals, powder 112 lb keg wks.....lb.	....	.09	.08½	.09	.08	.09
Chloride, crys bbls.....lb.	.04	.04¼	.04	.04¼	.04	.04¼
Chromate, kegs.....lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb. cases.....lb.	.55	.60	.55	.60	.50	.60
Iodide, 75 lb. bbls.....lb.	....	2.70	.....	2.70	2.35	2.70
Metabisulfite, 300 lb. bbl...lb.	.10½	.11	.10½	.11	.10½	.11
Oxalate, bbls.....lb.	.16	.24	.16	.24	.16	.24
Perchlorate, casks wks.....lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys 500 & 100 lb drs wks.....lb.	.18½	.19½	.18½	.19½	.17½	.19½
Prussiate, red, 112 lb keg...lb.	.39	.41	.35	.39	.39	.41
Yellow, 500 lb casks.....lb.	.18	.19	.18	.19	.16½	.19
Tartrate Neut, 100 lb keg...lb.	....	.21	.....	.21	....	.21
Titanium Oxalate, 200 lb bbls .....lb.	.32	.35	.32	.35	....	....
Propane, group 3, tanks.....	....	.07	.....	.07	....	.07
Pumice Stone, lump bags.....lb.	.04½	.06	.04½	.06	.04	.06
250 lb bbls.....lb.	.05	.07	.05	.07	.04½	.07
Powdered, 350 lb bags.....lb.	.02½	.03	.02½	.03	.02½	.03
Putty, commercial, tubs..100 lb.	....	2.25	.....	2.25	2.00	2.25
Linseed Oil, kegs.....100 lb.	4.00	4.50	4.00	4.50	3.40	4.50
Pyridine, 50 gal drums .....gal.	....	1.25	.....	1.25	.85	1.25
Pyrites, Spanish cif Atlantic ports bulk.....unit	.12	.13	.12	.13	.12	.13
Quebracho, 35% liquid tks...lb.	....	.02½	.....	.02½	.02	.02½
450 lb bbls c-1 .....lb.	....	.02½	.....	.02½	.02½	.02½
Solid, 63%, 100 lb bales cif..lb.	....	.02½	.02⅞	.03½	.02½	.03½
Clarified, 64%, bales... lb.	....	.03	.03	.03½	.02½	.03½
Quercitron, 51 deg liquid 450 lb bbls .....lb.	.05½	.06	.05½	.06	.05½	.06
Solid, 100 lb boxes.....lb.	.09½	.13	.09½	.13	.09½	.13
Bark, Rough.....ton	....	14.00	.....	14.00	....	14.00
Ground.....ton	34.00	35.00	34.00	35.00	34.00	35.00
R Salt, 250 lb bbls wks.....lb.	.40	.44	.40	.44	.40	.44
Red Sanders Wood, grd bbls. lb.	....	.18	.....	.18	....	.18
Resorcinol Tech, cans.....lb.	.65	.75	.65	.75	.65	.70
Rochelle Salt, cryst.....lb.	....	.12½	.....	.12½	....	....
Rosin Oil, 50 gal bbls, first run .....gal.	.46	.48	.45	.48	.42	.46
Second run.....gal.	.51	.53	.50	.53	.46	.51
FF Wood Rosin, c. l. N. Y.....	....	6.13	5.05	6.13	....	....
Rosins 600 lb bbls 280 lb.....unit ex. yard N. Y.						
B.....	....	5.75	4.50	5.75	2.75	5.15
D.....	....	5.85	4.60	5.85	2.95	5.15
E.....	....	6.50	4.80	6.50	3.55	5.15
F.....	....	6.75	5.00	6.75	3.85	5.17½
G.....	....	6.75	5.05	6.75	3.90	5.17½
H.....	....	6.75	5.10	6.75	4.00	5.17½
I.....	....	6.75	5.15	6.75	4.05	5.20
K.....	....	6.75	5.30	6.75	4.60	5.20
M.....	....	6.80	5.50	6.80	4.35	5.25
N.....	....	6.80	5.50	6.80	4.75	5.40

*Higher prices run to Jan.-June 1935.

Current

Rosin
Starch, Potato

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Rosin, WG	6.80	5.95	6.80	4.80	5.60
WW	6.85	.....	6.85	4.85	6.20
Rotten Stone, bags mines....ton	23.50 24.00	23.50	24.00	23.50	24.00
Lump, imported, bbls.....lb.	.05 .07	.05	.07	.05	.07
Selected bbls.....lb.	.09 .12	.09	.12	.09	.12
Powdered, bbls.....lb.	.02½ .05	.02½	.05	.02	.05
Sago Flour, 150 lb bags.....lb.	.02½ .03	.02½	.03	.02¼	.03
Sal Soda, bbls wks.....100 lb.	1.10 1.10	1.10	1.10	.90	1.10
Salt Cake, 94-96% c-1 wks...ton	13.00 18.00	13.00	18.00	13.00	18.00
Chrome.....ton	12.00 13.00	12.00	13.00	12.00	13.00
Saltpetre, double refd granular 450-500 lb bbls.....lb.	.... .06	.....	.06	.05¼	.06¾
Satin, White, 500 lb bbls.....lb.	.... .01½	.....	.01½	....	.01½
Shellac Bone dry bbls.....lb.	.29 .31	.29	.31	.18	.28
Garnet, bags.....lb.	.24 .25	.24	.25	.15	.20
Superfine, bags.....lb.	.23 .23¾	.23	.23¾	.09½	.18¾
T. N. bags.....lb.	.21 .21¼	.21	.21¼	.08½	.17¼
Schaeffer's Salt kegs.....lb.	.48 .50	.48	.50	.48	.50
Silica, Crude, bulk mines....ton	8.00 11.00	8.00	11.00	8.00	11.00
Refined, floated bags.....ton	22.00 30.00	22.00	30.00	22.00	30.00
Air floated bags.....ton	.... 32.00	.....	32.00	....	32.00
Extra floated bags.....ton	30.00 35.00	30.00	35.00	30.00	35.00
Silver Nitrate, vials.....oz.	.... .35½	.32¼	.33½	....	....
Soapstone, Powdered, bags f.o.b. mines.....ton	15.00 22.00	15.00	22.00	15.00	22.00
Soda Ash, 58% dense, bags c-1 wks.....100 lb.	.... 1.25	.....	1.25	1.17½	1.25
58% light, bags.....100 lb.	.... 1.23	.....	1.23	1.15	1.23
Soda Caustic, 76% grnd & flake drums.....100 lb.	.... 3.00	.....	3.00	2.90	3.00
76% solid drs.....100 lb.	.... 2.60	.....	2.60	2.50	2.60
Liquid sellers tanks, 100 bls.	.... 2.25	.....	2.25	2.15	2.25
Sodium Abietate, drs.....lb.	.... .06	.03	.06	....	.03
Acetate, tech 450 lb. bbls wks lb.	.04½ .05	.04½	.05	.04¼	.05
Alignate, drs.....lb.	.... .50	.....	.50	....	.50
Arsenate, drums.....lb.	.07½ .08½	.07½	.08½	.07½	.08½
Arsenite, drums.....gal.	.50 .75	.50	.75	.05	.75
Benzoate U.S.P., kegs.....lb.	.45 .47	.45	.47	....	....
Bicarb, 400 lb bbl.....100 lb.	.... 2.25	.....	2.25	....	2.25
Bichromate, 500 lb cks wks lb.	.06½ .06½	.06½	.06½	.044	.07
Bisulfite, 500 lb bbl wks....lb.	.03 .0335	.03	.0335	.02¼	.0335
Chlorate, wks.....lb.	.06¼ .07½	.06¼	.07½	.05¼	.07½
Chloride, technical.....ton	11.40 14.00	11.40	14.00	11.40	14.00
Cyanide, 96-98%, 100 & 250 lb drums wks.....lb.	.... .16½	.....	.16½	.15½	.16
Fluoride, 300 lb bbls wks....lb.	.07½ .09½	.07½	.09½	.07	.07½
Hydrosulfite, 200 lb bbls f.o.b. wks.....lb.	.20 .21	.20	.21	.20	.21
Hypochloride solution, 100 lb. cbys.....lb.	.... .05	.....	.05	....	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks.....100 lb.	2.40 3.00	2.40	3.00	2.40	3.00
Technical, regular crystals 375 lb bbls wks....100 lb.	2.40 2.65	2.40	2.65	2.40	2.65
Iodide.....lb.	.... 3.50	.....	3.50	3.10	3.50
Metanilate, 150 lb bbls....lb.	.41 .42	.41	.42	.44	.45
Metasilicate, c-1, wks..100 lb.	2.65 3.05	2.65	3.05	2 65	3.25
Monohydrate, bbls.....lb.	.... .02½	.....	.02½	....	.02½
Naphthionate, 300 lb bbl...lb.	.52 .54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb. bags c-1 NY .....100 lb.	.... 1.31½	.....	1.31½	1.26	1.31½
100 lb. bags lb. .....ton	.... 27.00	.....	27.00	....	....
Bulk.....ton	.... 24.50	.....	24.50	....	....
Nitrite, 500 lb bbls spot....lb.	.07¼ .08	.07¼	.08	.07¼	.08
Orthochlorotoluene, sulfonate, 175 lb bbls wks.....lb.	.25 .27	.25	.27	.25	.27
Perborate, 275 lb bbls.....lb.	.18 .19	.18	.19	.17	.19
Peroxide, bbls. 400 lb. ....lb.	.... .17	.....	.17	....	....
Phosphate, di-sodium, tech. 310 lb bbls.....100 lb.	2.20 2.40	2.20	2.40	2.00	2.40
tri-sodium, tech, 325 lb bbls.....100 lb.	.... 2.60	.....	2.60	2.15	2.50
Picramate, 160 lb kegs ....lb.	.69 .72	.69	.72	.69	.72
Prussiate, Yellow, 350 lb bb' wks.....lb.	.11½ .12	.11½	.12	.11½	.12
Pyrophosphate, 100 lb keg..lb.	.16½ .18	.16½	.18	.15	.20
Silicate, 60 deg 55 gal drs, wks .....100 lb.	1.65 1.70	1.65	1.70	1.65	1.70
40 deg 55 gal drs, wks .....100 lb.	.... .80*	.....	.80*	.75	.80
Silicofluoride, 450 lb bbls NY .....lb.	.05 .06	.05	.06	.04½	.06
Stannate, 100 lb drums.....lb.	.34 .37	.34	.37	.18	.37
Stearate, bbls.....lb.	.20 .25	.20	.25	.20	.25
Sulfanilate, 400 lb bbls.....lb.	.16 .18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-1 wks.....lb.	.022 .0285	.022	.0285	.02	.0285
Sulfide, 80% crystals, 440 lb bbls wks.....lb.	.... .02½	.02½	.02½	.02½	.02¾
62% solid, 650 lb drums c. l. wks.....lb.	.... .03	.....	.03	....	.03
Sulfite, crystals, 400 lb bbls wks.....lb.	.02½ .02½	.02½	.02½	.03	.03½
Sulfocyanide, bbls .....lb.	.28 .35	.28	.35	.28	.35
Tungstate, tech, crystals, kegs .....lb.	.70 .75	.70	.75	.57	.67
Spermaceti, blocks, cases.....lb.	.18 .19	.18	.19	.17	.22
Cakes, cases.....lb.	.19 .20	.19	.20	.18	.23
Spruce Extract, ord., tanks..lb.	.... .01	.....	.01	.00¾	.01
Ordinary, bbls.....lb.	.... .01½	.....	.01½	.01½	.01½
Super spruce ext., tanks...lb.	.... .01½	.....	.01½	.01½	.01½
Super spruce ext., bbls....lb.	.... .01½	.....	.01½	.01½	.01½
Super spruce ext. powd., bags .....lb.	.... .04	.....	.04	....	.04
Starch, powd, 140 lb bags .....100 lb.	2.81 3.01	2.81	3.01	2.29	3.01
Pearl, 140 lb bags.....100 lb.	2.71 2.91	2.71	2.91	2.19	2.91
Potato, 200 lb bags.....lb.	.05½ .06	.05½	.06	.03¾	.06
Imported bags.....lb.	.06 .06½	.06	.06½	.04½	.06½

*Tanks, 15c less.

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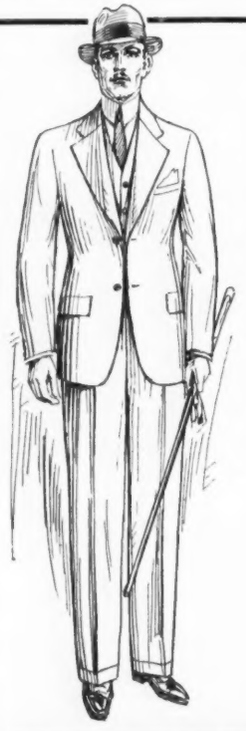

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574 FIFTH AVENUE · (at 47th Street) · NEW YORK CITY

Starch, Potato
Zinc Dithiofuroate

Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Starch, Potato Soluble ....lb.	.08	.08	.08½	.08	.08½
Rice, 200 lb bbls....lb.	.07½	.08½	.07½	.08½	.07	.08½
Wheat, thick bags....lb.	.06¼	.06¾	.06¼	.06¾	.05¾	.06¾
Thin bags....lb.	.10	.10½	.10	.10½	.09½	.10½
Strontium carbonate, 600 lb bbls wks....lb.	.07½	.07½	.07½	.07½	.07½	.07½
Nitrate, 600 lb bbls NY....lb.	.10½	.11	.10½	.11	.07	.11
Peroxide, 100 lb drs....lb.	....	1.25	.....	1.25	....	1.25
Sulfur Brimstone, broken rock, 250 lb bag c-l....100 lb.	....	2.05	.....	2.05	....	2.05
Crude, f. o. b. mines....ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour for dusting 99½%, 100 lb bags c-1 NY....100 lb.	....	2.40	.....	2.40	....	2.40
Heavy bags c-1....100 lb.	....	2.50	.....	2.50	....	2.50
Flowers, 100%, 155 lb bbls c-1 NY....100 lb.	....	3.45	.....	3.45	....	3.45
Roll, bbls lc-1 NY....100 lb.	2.65	2.85	2.65	2.85	2.65	2.85
Sulfur Chloride, red, 700 lb drs wks....lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs wks....lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl....lb.	.07	.08	.07	.08	.07	.08
Extra, dry, 100 lb cyl....lb.	.11	.13	.11	.13	.10	.13
Sulfuryl Chloride....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, ground....ton	....	74.00	69.00	75.00	50.00	75.00
Talc, Crude, 100 lb bgs NY..ton	12.00	15.00	12.00	15.00	12.00	15.00
Refined, 100 lb bgs NY..ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bags NY....ton	27.50	30.00	27.50	30.00	18.00	30.00
Refined, white, bags....ton	45.00	60.00	45.00	60.00	35.00	60.00
Italian, 220 lb bags to arr..ton	70.00	75.00	70.00	75.00	48.50	75.00
Refined, white bags N.Y.ton	75.00	80.00	75.00	80.00	50.00	80.00
Superphosphate, 16% bulk, wks....ton	....	8.00	.....	8.00	6.50	8.00
Run of pile....ton	....	7.50	.....	7.50	6.00	7.50
Tankage Ground NY....unit	....	2.75*	2.50	2.75*	1.70	2.75*
Unground....unit	....	2.35	.....	2.35	2.35	2.60
High grade f.o.b. Chicago.unit	....	2.40*	1.90	2.40*	1.40	3.00
South American cif....unit	....	3.10*	3.00	3.10*	....	2.50
Tapioca Flour, high grade bgs.lb	.03	.05	.03	.05	.03	.05
Medium grade, bags....lb.	.03	.04	.03	.04	.03	.04
Tar Acid Oil, 15%, drums...gal.	.21	.22	.21	.22	.20	.22
25% drums....gal.	.23	.24	.23	.24	.22	.24
Tartar Emetic, Tech....gal.	....	.22¾	.23	.23	....	....
U. S. P....gal.	.28	.28½	.27	.28½	....	....
Terra Alba Amer. No. 1, bgs or bbls mills....100 lb.	1.15	1.75	1.15	1.75	1.15	1.75
No. 2 bags or bbls...100 lb.	1.00	1.25	1.00	1.25	1.00	1.25
Imported bags....lb.	.01½	.01½	.01½	.01½	.01½	.01¼
Tetrachlorethane, 50 gal dr..lb.	.08½	.09	.08½	.09	.08½	.09
Tetralene, 50 gal drs wks....lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl....lb.	.20	.25	.20	.25	.25	.28½
Tin....						
Crystals, 500 lb bbls wks...lb.	....	.38½	.30	.38½	.24	.41
Metal Straits NY....lb.	....	.50¼	.....	.50¼	.23	.57
Oxide, 300 lb bbls wks....lb.	.55	.57	.55	.59	.27½	.59
Tetrachloride, 100 lb drs wks....lb.	.26	.27	.25½	.27	.126	.28
Titanium Dioxide 300 lb bbl..lb.	.17½	.19½	.17½	.19½	.17½	.19½
Calcium Pigment, bbls....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Toluene, 110 gal drs....gal.	....	.35	.....	.35	....	.35
8000 gal tank cars wks....gal.	....	.30	.....	.30	....	.30
Toluidine, 350 lb bbls....lb.	.88	.89	.88	.89	.88	.89
Mixed, 900 lb drs wks....lb.	.27	.28	.27	.28	.27	.28
Toner Lithol, red, bbls....lb.	.80	.85	.80	.85	.80	.95
Para, red, bbls....lb.	....	.80	.....	.80	....	.80
Toluidine....lb.	....	1.35	.....	1.35	1.35	1.55
Triacetin, 50 gal drs wks....lb.	.32	.36	.32	.36	.32	.36
Trichlorethylene, 50 gal dr...lb.	.09½	.10	.09½	.10	.09½	.10
Triethanolamine, 50 gal drs...lb.	.35	.38	.35	.38	.35	.38
Tricresyl Phosphate, drs....lb.	.19	.26	.19	.26	.19	.26
Triphenyl guanidine....lb.	.58	.60	.58	.60	.58	.60
Phosphate, drums....lb.	.37	.39	.37	.39	.37	.39
Tripoli, 500 lb bbls....100 lb.	.75	2.00	.75	2.00	.75	2.00
Tungsten, Wolframite..per unit	12.00	12.50	12.00	12.50	10.00	12.50
Turpentine carlots, N. Y. dock bbls....gal.	....	.63½	.47¾	.63½	.46½	.51½
Savannah, bbls....gal.	....	.58½	.42¾	.58½	....	....
Jacksonville, bbls....gal.	....	.58½	.43	.58½	....	....
Wood Steam dist, bbls, c. l. N. Y....gal.	....	.61	.44	.61	.42	.48
Urea, pure, 112 lb cases....lb.	.15	.17	.15	.17	.15	.17
Fert. grade, bags c.i.f....ton	....	90.00	.....	90.00	82.60	90.00
c. i. f. S. points....ton	....	90.00	.....	90.00	82.60	90.00
Urea Ammonia liq. 55% NH_3, tanks....unit	....	.96	.....	.96	....	....
Valonia Beard, 42%, tannin bags....ton	39.00	40.00	.....	40.00	27.50	42.00
Cups, 30-31% tannin....ton	26.00	27.00	23.00	27.00	17.00	25.00
Mixture, bark, bags....ton	....	28.00	.....	28.00	22.00	28.00
Vermillion, English, kegs....lb.	1.52	1.67	1.41	1.67	1.05	1.42
Vinyl Chloride, 16 lb cyl....lb.	....	1.00	.....	1.00	....	1.00
Wattle Bark, bags....ton	31.00	32.00	31.00	34.00	24.00	32.00
Extract 55%, tanks, bbls...lb.	....	.05¾	.....	.05¾	.03	.05¾
Whiting, 200 lb bags, c-1 wks....100 lb.	.85	1.00	.85	1.00	.85	1.00
Alba, bags c-1 NY....ton	....	15.00	.....	15.00	13.00	15.00
Gilders, bags c-1 NY...100 lb.	....	1.35	.....	1.35	....	1.35
Wood Flour, c-l....bags	18.00†	30.00	18.00†	30.00	18.00	36.00
Xylene, 10 deg tanks wks...gal.	....	.29	.....	.29	.29	.29
Commercial, tanks wks...gal.	....	.26	.....	.26	....	.26
Xylidine, crude....lb.	.36	.37	.36	.37	.36	.37
Zinc Ammonium Chloride powd., 400 lb bbls....lb.	.04¾	.05	.04¾	.05	.04¾	.05
Carbonate Tech. bbls NY..lb.	.09½	.11	.09½	.11	.09½	.11
Chloride Fused, 600 lb drs wks....lb.	.04¼	.05	.04¼	.05	.05	.05¾
Gran, 500 lb bbls wks....lb.	....	.05½	.05½	.06	.05½	.06
Soln 50%, tanks wks...100 lb.	....	2.00	.....	2.00	....	3.00
Cyanide, 100 lb drums....lb.	.38	.39	.38	.39	.38	.39
Dithiofuroate, 100 lb dr....lb.	....	1.00	.....	1.00	....	1.00

*&10 †Depends upon grade

Current

Zinc Dust
Whale Oil

	Current Market		1934 Low	1934 High	1933 Low	1933 High
Zinc Dust, 500 lb bbls c-l wks ....lb.	.0705	.071	.0705	.071	.04¾	.07½
Metal, high grade slabs c-l NY....100 lb.	....	4.75	4.65	4.87	3.02	5.37
Oxide, American bags wk...lb.	.05½	.06½	.05¾	.06½	.05	.06
French, 300 lb bbls wks...lb.	.05¾	.11½	.05¾	.11⅛	.05¾	.11½
Palmitate, bbls....lb.	.20	.21	.20	.21	.17½	.21
Perborate, 100 lb drs....lb.	....	1.25	.....	1.25	....	1.25
Peroxide, 100 lb drs....lb.	....	1.25	.....	1.25	....	1.25
Resinate, fused, dark, bbls. lb.	.05¾	.06½	.05¾	.06½	.05¾	.06½
Stearate, 50 lb bbls....lb.	.18	.19	.18	.19	.15	.19
Sulfate, crystals, 400 bbl wks lb.	.028	.033	.02¾	.033	.03	.03½
Flake, bbls....lb.	.032	.037	.....	.....	....	....
Sulfide, 500 lb bbls....lb.	.13	.13½	.13	.13½	.12	.13½
Sulfocarbolate, 100 lb keg..lb.	.21	.22	.21	.22	.21	.22
Zirconium Oxide, Nat. kegs...lb.	.02½	.03	.02½	.03	.02½	.03
Pure kegs....lb.	.45	.50	.45	.50	.45	.50
Semi-refined kegs....lb.	.08	.10	.08	.10	.08	.10

Oils and Fats

Castor, No. 1, 400 lb bbls....lb.	....	.09¾	.....	.09¾	.09¼	.10
No. 3, 400 lb bbls....lb.	....	.09¾	.....	.09¾	.08½	.09¾
Blown, 400 lb bbls....lb.	.12¼	.12¾	.12¼	.12¾	.11¼	.12¾
China Wood, bbls spot NY...lb.	.08½	.08¾	.07½	.08½	.04¼	.09½
Tanks, spot NY....lb.	.078	.08	.07¼	.08	.04¼	.08½
Coast, tanks....lb.	.07⅞	.07½	.06⅝	.07½	.04⅛	.08⅛
Coconut, edible, bbls NY....lb.	....	.10¼	.....	.10¼	....	.10¼
Ceylon, 375 lb bbls NY....lb.	.03⅝	.03¾	.03⅞	.03¾	.03⅞	.04¼
8000 gal tanks NY....lb.	.02⅝	.02¾	.02⅝	.02¾	.02½	.03⅜
Cochin, 375 lb bbls NY....lb.	.04¼	.04½	.04¼	.04½	.04½	.05¼
TanksN Y....lb.	.04	Nom.	.04	Nom.	.04	.05
Manila, bbls NY....lb.	.03⅝	.03¾	.03⅝	.04	.03⅞	.04¼
Tanks NY....lb.	.02⅝	.03	.02¾	.03	.02¾	.03¼
Tanks, Pacific Coast....lb.	.02½	.02⅞	.02½	.02⅞	.02½	.03⅛
Cod, Newfoundland, 50 gal bbls ....gal.	.40	Nom.	34	.40	.19	.35
Copra, bags, N. Y....lb.	.0135	.015	.0135	.016	.0152½	.019
Corn, crude, bbls NY....lb.	.05¾	.05⅞	.04⅜	.05⅞	.04⅜	.07¼
Tanks, mills....lb.	.04¾	.04⅞	.03½	.04⅞	.02⅞	.06½
Refined, 375 lb bbls NY...lb.	.06¾	.07¼	.05¾	.07¼	.05¾	.08¼
Cottonseed, crude, mill Southeast & Valley....lb.			*(See Oils and Fats News Section)*			
Texas....lb.			*(See Oils and Fats News Section)*			
Degras, American, 50 gal bbls NY....lb.	.02¾	.03	.02¾	.03	.02½	.03
English, brown, bbls NY...lb.	.03¾	.04	.03¾	.04	.02¾	.04
Greases, Brown....lb.	.02½	.03	.02	.03	.02	.03½
Yellow....lb.	.03½	.03½	.02¾	.03½	.01¾	.03⅜
White, choice bbls NY....lb.	.03¼	.03⅞	.02¾	.03⅞	.02½	.04⅛
Herring, Coast, Tanks....gal.	.15	Nom.	.15	15	.11	.23
Lard Oil, edible, prime....lb.	....	.09¾	.....	.09¾	.08½	.10½
Extra, bbls....lb.	....	.07¾	.....	.07¾	.07½	.08¼
Extra No. 1, bbls....lb.	....	.07½	.....	.07½	.06	.08
Linseed, Raw, lessthan5bbl.lotslb.	....	.101	.101	.105	.08	.12
Bbls c-l spot....lb.	....	.097	.093	.097	.072	.11
Tanks....lb.	....	.091	.087	.091	.066	.104
Menhaden Tanks, Baltimore.gal.	.15	.17	.15	.17	.09	.15
Refined, alkali bbl....lb.	.063	.069	.063	.069	....	....
Tanks....lb.	....	.059	.059	.061	....	....
Light Pressed, bbls....lb.	.051	.057	.051	.057	....	....
Tanks....lb.	....	.047	.047	.049	....	....
Neatsfoot, CT, 20° bbls NY...lb.	....	.16½	.....	.16½	.11¾	.16¾
Extra, bbls NY....lb.	....	.07¾	.....	.07¾	.06½	.08¼
Pure, bbls NY....lb.	....	.13	.....	.13	.07¾	.14
Oleo, No. 1, bbls NY....lb.	....	.06½	.06½	.06½	.05	.06⅞
No. 2, bbls NY....lb.	....	.05⅞	.05⅞	.05⅞	.04½	.06⅜
Olive, denatured, bbls NY...gal.	.82	.86	.76	.86	.47	.80
Edible, bbls NY....gal.	1.65	1.90	1.60	1.90	1.30	1.85
Foots, bbls NY....lb.	.06½	.06⅝	.06½	.06⅝	.04⅜	.06¾
Palm, Kernel Casks....lb.	.04¼	Nom.	.04¼	Nom.	.04	.04⅝
Lagos, 1500 lb casks....lb.	.03⅝	.03¾	.03⅝	.03¾	.02⅝	.04¾
Niger, Casks....lb.	.03⅜	.03½	.03⅜	.03½	.024	.04½
Peanut, crude, bbls NY....lb.	....	.07¼	.06½	.07¼	.03½	.07
Refined, bbls NY....lb.	.08½	.10	.07½	.10½	.07½	.11
Perilla, bbls NY....lb.	.08⅝	.08⅞	.08⅝	.08¾	.05	.10½
Tanks, Coast....lb.	.07¼	Nom.	07½	.07¾	.03¾	.09¾
Poppyseed, bbls NY....gal.	1.45	1.60	1.45	1.60	1.45	1.70
Rapeseed, blown, bbls NY...gal.	.08	.082	.08	082	....	....
denatured, drms, NY....gal.	.41½	.42½	.41½	.44	.34	.65
Red, Distilled, bbls....lb.	.07	.07⅜	.07	.07⅜	.05⅜	.07⅜
Tanks....lb.	....	.06	.....	.06	.05	.06
Salmon, Coast, 8000 gal tks. gal.	.15	Nom.	.15	.17	.11	.18
Sardine, Pacific Coast tks...gal.	.15	Nom.	.13	.16	.09½	.20
Sesame, edible, yellow, dom..lb.	.07½	.08	.07½	.09	.08½	.10
White, dos....lb.	.08	.08½	.08	.09½	.10	.11
Sod, bbls NY....gal.	....	.40	.....	.40	....	.40
Soy Bean, crude....						
Pacific Coast....lb.	....	Nom.	.....	Nom.	.032	.035
Domestic tanks, f.o.b. mills, lb.	....	.06½	.06	.06½	.027	.085
Crude, bbls NY....lb.	.066	.07	.066	.071	.04	.095
Refined, bbls NY....lb.	.076	.087	.071	.087	.04½	.106
Sperm, 38° CT, bleached, bbls NY....lb.	.108	.11	.108	.11	....	....
45° CT, bleached, bbls NY..lb.	.101	.103	.101	.103	....	....
Stearic Acid, double pressed dist bags....lb.	.09½	.10	.09½	.10	.07½	.10
Double pressed saponified bags ....lb.	.09½	.10	.09½	.10	.08	.10
Triple, pressed dist bags..lb.	.12¼	.12¾	.12¼	.12¾	.10½	.12¾
Stearine, Oleo, bbls....lb.	.05	.05½	.....	.05½	.03½	.06¼
Tallow City, extra loose....lb.	....	.03½	.02⅞	.03½	.02	.03⅞
Edible, tierces....lb.	....	.04¼	....	.04¾	.03½	.05⅛
Tallow Oil, Bbls, c-l NY...lb.	.05¾	.06	.05¾	.06	.05¾	.06
Acidless, tanks NY....lb.	....	.06¾	.....	.06¾	.05	.07½
Vegetable, Coast mats....lb.	.06	Nom.	.06	Nom.	.04½	.06
Turkey Red, single, bbls ....lb.	.07½	....	.07½	....	.06½	.07½
Double, bbls....lb.	.12½	.13	.12½	.13	.08	.13
Whale,....						
Winter bleached, bbls, NY..lb.	....	.072	.....	.072	....	....
Refined natural, bbls, NY..lb.	.068	.07	.068	.07	....	....

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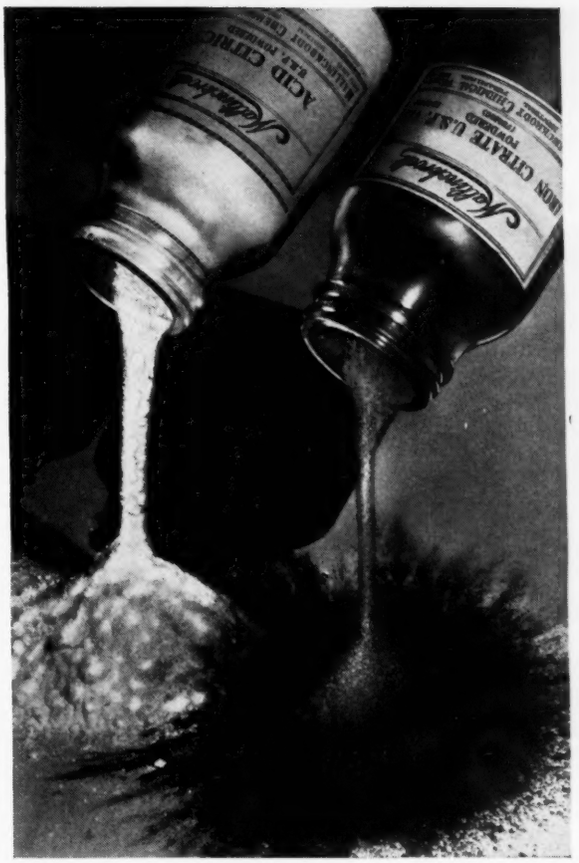

Citrates

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Green Scales
Potassium Citrate U.S.P. Gran. & Powd.
Sodium Citrate:
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"We"—Editorially Speaking

The Chemical Code—on again, off again, gone again Finnegan.

Harry Publicker is undoubtedly one of the most energetic and versatile executives in the alcohol industry, but we have serious doubts if he could live up to the role assigned to him as guiding genius of the American Commercial Alcohol Company by John Flynn in *Collier's*.

On the very day that President Roosevelt admonished industry to raise wages and shorten hours, Postmaster Farley orders a 38 million wage cut and General Johnson promises to crack down on anybody raising consumer goods prices. Consistency may not be a jewel but this is certainly a gem.

And speaking of consistency, the well-known *"O.P.D."* commenting editorially on the NRA hearings in Washington says: "One thing stands out clear: nobody loves the NRA. There is, it was indicated, a measure of affection here and there for the new Government agency." These two consecutive sentences are certainly the height of something or other—possibly conservatism.

Among the companies who cooperated with the Metropolitan Life Insurance in the preparation of their budget report are the following: Air Reduction, Cyanamid, Archer-Daniels-Midland, Bird & Son, Celotex Company, Champion Fibre Company, Dewey & Almy, du Pont, Eagle-Picher Lead, Johns-Manville, Koppers Corporation, E. J. Lavino & Company, Merrimac Chemical, and Victor Chemical Works.

H. V. Churchill, an Iowan, spent his early years in teaching school, and when war was declared entered the Chemical Warfare Service. After the armistice he connected with the Aluminum Company of America as chemist, rising to chief chemist in 1919, and has been head of the Analytical Division of their research laboratories ever since. One of his noteworthy professional achievements was the investigation of the connection between a mottled condition of tooth enamel and the presence of fluorine in drinking water. He is one of the leading authorities on the chemical behavior of aluminum and has contributed chapters on the subject to various technical works. Away from the laboratory he plays golf in the middle 80's, and is a formidable opponent at chess and contract bridge.

The world's most isolated power plant according to *The Chemical Age* is probably at the mines of the Mutual Chemical Co. in New Caledonia, a French island 750 miles off the coast of Queensland and 1,000 miles from Sydney. To aid the mining of chrome ore there, the company has installed a battery of Diesel engines and air compressors. To insure against interruption in the operation of the plant, special attention must be paid to the lubrication of the machinery, and all the equipment is lubricated with products of the Vacuum Oil Co., according to methods worked out by their engineers. A major breakdown would require sending 12,000 miles for a spare part, and operations would be hindered for six to nine months.

Cyril S. Kimball has been closely associated with the chemical specialty industry, which includes metal polishes of all kinds, since receiving his B. S. degree in chemistry in 1926. First as an assistant to Dr. Snell, later as chemist working directly on the problems in the laboratory and still later as chief chemist in charge of Dr. Snell's laboratory, he has followed the problems, changes and developments in the industry. His work takes him into the plants where polishes are made and into their fields of use. It would be hard indeed to find a polish manufacturer in this country who is not familiar with the extensive work in this field being carried out by Mr. Kimball.

To change 40 hours at a $30 weekly wage rate by increasing wages ten per cent. and shortening hours to 36 raises the hourly rate from 75¢ to 91⅔¢, an increase in 22.22 per cent. of labor costs. These are some figures that apparently a whole lot of people don't take the time to calculate and cogitate.

If "We" appear a little distrait and windblown, forgive us, for the 1934 edition of the GUIDE-BOOK is going "through the works" this month. The firms that do not return the Questionnaires are always the ones who complain that their listings are not correct and in the midst of revisions and conciliations it was pleasant to have an important chemical company write on their Questionnaire: "Compliments on your CHEMICAL GUIDE-BOOK: it's a great assistance to us throughout the entire year."

Fifteen Years Ago

From our issues of March, 1919

Schoellkopf's sell 70,000 preferred shares of National Aniline valued at about $6,000,000.

Du Pont Company reports that it supplied forty per cent. of the explosives for the Allies.

Government reaches tentative agreement with manufacturers of explosives whereby 50,000,000 pounds of surplus ammonium nitrate and 102,000 pounds of fulminate of mercury held by War Department will be disposed of in such a way as not to upset market conditions.

Major Charles V. Bacon, consulting chemist and chemical engineer, made chief of research section, engineering and standardization branch of the General Staff of War Department.

Phenol production for 1918 suffices for peacetime needs for twenty years.

Lord Cecil M. Brabourne arrives to confer with potash executives with the object of banding American potash interests together to induce Government to place protective tariff on the industry to make this country independent of German supplies.

Coming

Wall Street's expert appraisal of the future of the chemical industry is definitely and graphically expressed by the portfolios of the big investment trusts, which have been analyzed for their chemical holdings for the past five years by Fred. A. Hessel.

Semi-works plants are no novelty and a very practical link between research and commercial production, and a description of the model experimental plants at the new laboratory of Princeton University will appear by Professor Joseph C. Elgin.

In the far South, salt, sulfur, lime, petroleum, and gas, all found in the same neighborhood, create a raw material foundation unique in the world. The rapid chemical developments in this section will be reported to our readers by Williams Haynes, who will take a five weeks, six thousand mile trip through this section.